INSTRUMENTATION & ENGINE MONITORING SYSTEMS

2018–2019

INDEX

HOW TO USE THE CATALOGUE

Product Images

Part Name

Description and other information

Section Heading

TEMPERATURE GAUGES - ELECTRIC

Suitable for most vehicles and machines. Illumination 12 or 24V included.
For other sender units please refer to page 22

TEMPERATURE GAUGES -WATER

Part no.	Range (ºC)	Diameter (mm)	Voltage (V)
310-030-002C	40-120	52	12
310-040-002C	40-120	52	24

With ISO symbol. 40-120ºC = 100-250ºF

SENDER ONLY

Part no.	Range (ºC)	Thread	Terminal
323-801-005-001D	40-120	1/8-27NPTF	Button

SENDER/SWITCH COMBINATION

Part no.	Range (ºC)	Thread	Switch Point (ºC)
323-803-001-011D	40-120	5/8" 18UNF	95
323-803-001-016D	40-120	M14x1.5	94
323-803-001-001D	40-120	M14x1.5	100

40-120ºC = 100-250ºF

PARTS LISTING –
COCKPIT INTERNATIONAL

Classic round instruments using state-of-the art technology.

The cockpits of trucks, construction and agricultural machinery or stationary machine panels can no longer be imagined without the classic VDO round instruments. The wide range, robust design and extensive years of experience are what makes these instruments “classics”.

GAUGES

AMMETER – WITH INTERNAL SHUNT

Suitable for most engines. **Monitors charge and battery condition**. Voltage (V) independent – suitable for 12 &24V. Ammeters with internal shunt are easily identified by the heavy duty threaded terminals. Heavy duty wire must be used for wiring. Illumination globe holder not included.

For 24V application use globe **999-065-002**
For 12V application use globe **999-065-001**
Globe Holder part no. **999-067-001**

Part no.	Range	Diameter (mm)
190-037-001C	30-0-30AMP	52
190-037-002C	60-0-60AMP	52
190-037-003C	100-0-100AMP	52

CLOCK – QUARTZ

The VDO Quartz Clock offers accurate timing to within ±1 second per day.
The crystallographic properties of quartz ensure that the electric current is precisely regulated for accurate timing.

ELECTRONIC CLOCKS

Part no.	Range (V)	Diameter (mm)
370-214-031-001G	12	52
370-214-031-003G	24	52

FUEL GAUGES – LEVER

Suitable for use with petrol and diesel fuel.
Illumination 12V and 24V included.

FUEL GAUGES 10-180OHMS

Part no.	Range	Diameter (mm)	Voltage (V)
301-030-001C	0-1/1	52	12
301-040-001C	0-1/1	52	24

For tank units with 10-180Ohms resistance. Without ISO symbol.

SENDER - ADJUSTABLE FLOAT ARM

Part no.	Specifications	Length (mm)
220-003	0-1/1 (Empty 10Ohm)	150-600 (Full 180Ohm)

SENDER - PLASTIC ADJUSTABLE INCLUDES WARNING CONTACT

Part no.	Specifications	Length (mm)
A2C59510162	3-180Ohms	145-400

GAUGES (CONT...)

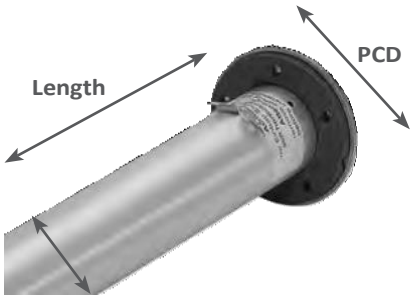
FUEL GAUGES - TUBULAR

FUEL GAUGES - TUBULAR

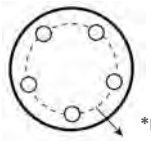
Part no.	Range	Diameter (mm)	Voltage (V)
301-030-002C	0-1/1	52	12
301-040-002C	0-1/1	52	24

With ISO symbol for fuel level. For tubular tank units, adjustable resistance range.
Full 3Ohm. Empty 90Ohm

TUBULAR TYPE SENDERS (PCD* PITCH CIRCLE DIAMETER (MM))



Cut-Out Diameter (mm)



***PCD:** Pitch Circle Diameter

Part no.	Description	Diameter (mm)	Length (mm)
224-011-000-190G	Fuel dip pipe sender	54	190
224-011-000-250X	Fuel dip pipe sender	54	190
224-011-000-300X	Fuel dip pipe sender	54	300
224-011-000-340X	Fuel dip pipe sender	54	340
224-011-000-350G	Fuel dip pipe sender	54	350
224-011-000-370X	Fuel dip pipe sender	54	370
224-011-000-390X	Fuel dip pipe sender	54	390
224-011-000-450X	Fuel dip pipe sender	54	450
224-011-000-500G	Fuel dip pipe sender	54	500
224-011-000-500X	Fuel dip pipe sender	54	500
224-011-000-600G	Fuel dip pipe sender	54	600
224-011-000-800G	Fuel dip pipe sender	54	800
224-011-000-664X	Fuel dip pipe sender	54	664.5
224-011-000-008R	Fuel dip pipe sender	54	189.5

TUBULAR TYPE SENDERS (HEAVY DUTY)

Part no.	Description	Diameter (mm)	Length (mm)
X10-224-009-029	Fuel dip pipe sender	80	741
X10-224-009-039	Fuel dip pipe sender	80	596
X10-224-009-040	Fuel dip pipe sender	80	1086

TUBULAR TYPE SENDERS (INSULATED VERSIONS)

Part no.	Description	Diameter (mm)	Length (mm)
X10-224-021-001	Fuel dip pipe sender	80	536
X10-224-021-006	Fuel dip pipe sender	80	846

Please note: All 54mm PCD have an **aluminium body**.
All 80mm PCD have a **steel body**.

ACCESSORIES

Part no.	Description	PCD* (mm)
2-250-234	Gasket, cork	54
2-251-006	Gasket, cork	80
2-251-016	Gasket, rubber	80
1403141	Flange only	
1403145	Flange and gasket	54

GAUGES (CONT...)

HOURMETER - ELECTRONIC

Suitable for all vehicles and machines. Available with 360º minute hand sweep or as counters only. 24V application use resistor supplied.

24V application use resistor supplied.

WITH 360º SWEEP HAND, BLACK BEZEL

Part no.	Range	Diameter (mm)	Voltage (V)	Light
331-810-012-002G	0-99999.9hrs	52	12	No light
331-810-012-007G	0-99999.9hrs	52	24	With light

NO MINUTE HAND, BLACK BEZEL

Part no.	Range	Diameter (mm)	Voltage (V)
331-810-012-001X	0-99999.9hrs	52	12

24V application use resistor supplied.

ACCESSORIES

Part no.	Description	Thread	Voltage (V)
230-112-001-002C	Pressure switch 5 watt - N/O 70 kPa	1/8" - 27NPTF	6-24V

HOURMETER - VIBRATION TYPE

For control of motors and engines as well as for recording the operating time of machinery not connected to an electric power supply but generating vibrations in service.

WITH 360º SWEEP HAND, BLACK BEZEL

Part no.	Description
D611008	52mm
D611010	60mm
D611012	52mm with anti-vibration mounting kit
D761120	60mm bracket
D761130	72mm bracket
D761143	Vibration ring assembly

- Installation is simple as no source of current is required.
- Vibration-proof clockwork operating with high accuracy.
- Metering capacity 99.999 hours with minute read-out.
- Suitable for installation in openings of different diameters with mask or damper ring.
- Waterproof and tropicalised.
- Fit for service in ambient temperatures from -15ºC to +60ºC.
- Designed for flush and surface mounting.

GAUGES (CONT...)

PRESSURE GAUGE - ELECTRIC

Suitable for all vehicles and machines. Illumination 12 or 24V included.
Note: Not recommended for petrol or water. Pressure sender adaptors are listed on page 130

PRESSURE GAUGES, ENGINE OIL PRESSURE 500KPA

Part no.	Range (kPa)	Diameter (mm)	Voltage (V)
350-030-016C	0-500	52	12
350-040-016C	0-500	52	24

With ISO symbol. 500kPa = 72.5 PSI

SENDER ONLY 500KPA

Part no.	Range (kPa)	Thread	Voltage (V)
360-081-029-004C	500	1/8" - 27NPTF	12/24

SENDER/SWITCH COMBINATION

Part no.	Range (kPa)	Thread	Switch Point
360-081-030-049C	500	1/8" - 27NPTF	50kPa

Refer to your engine manufacturers manual for correct oil pressure.
Note: 500kPa = 72.5PSI. Additional senders are listed on page 10.

PRESSURE GAUGES, ENGINE OIL PRESSURE 1000KPA

Part no.	Range (kPa)	Diameter (mm)	Length
350-030-017C	0-1000	52	12
350-040-017C	0-1000	52	24

With ISO symbol. 1000kPa = 145 PSI

SENDER ONLY 1000KPA

Part no.	Range (kPa)	Thread	Voltage (V)
360-081-029-012C	1000	1/8" - 27NPTF	12/24

SENDER/SWITCH COMBINATION

Part no.	Range (kPa)	Thread	Switch Point
360-081-030-052C	1000	1/8" - 27NPTF	50kPa

Refer to your engine manufacturers manual for correct oil pressure.
Note: 1000kPa = 145PSI. Additional senders are listed on page 10.

PRESSURE GAUGES, TRANSMISSION OIL PRESSURE

Part no.	Range (bar)	Diameter (mm)	Voltage (V)
350-030-005C	0-25	52	12
350-040-005G	0-25	52	24

With ISO symbol. 25 bar = 2500kPa = 360PSI

SENDER ONLY 2500KPA

Part no.	Range (bar)	Thread	Voltage (V)
360-081-038-003C	0-25	360PSI 1/8" - 27NPTF	12/24

GAUGES (CONT...)

PRESSURE GAUGE - ELECTRIC (CONT...)

PRESSURE GAUGE, AIR BRAKE

Part no.	Range (Bar)	Diameter (mm)	Voltage (V)
350-040-011G	10 bar	52	24

With ISO symbol. Brake

SENDER ONLY 1000KPA

Part no.	Range (Bar)	Thread	Voltage (V)
360-081-029-012C	1000	1/8" – 27NPTF	12/24

PRESSURE GAUGE - MECHANICAL

Suitable for most vehicles and machines. Can be used on most non-aggressive gases and liquids. Supplied with nut and cone for 3/16" PVC tubing.
Globe Holder not included.

For 24V application use globe part no. **999-065-002**

For 12V application use globe part no. **999-065-001**

Globe Holder part no. **999-067-001**

Part no.	Range	Diameter (mm)
150-035-020G	0-1000kPa	52
150-035-004G	0-7 bar	52

TURBO BOOST GAUGE - MECHANICAL

Suitable for all vehicles. Supplied with nut and cone for 3/16" PVC tubing.
Illumination 12V included. **Pipe kit not included.**

Part no.	Range (bar)	Diameter (mm)
150-015-001K	0 to +3	52

ACCESSORIES

Part no.	Description	Length (m)
150-005	Pressure pipe kit	2
150-006	Pressure pipe kit	5
150-007	Pressure pipe kit	6

GAUGES (CONT...)

TURBO CHARGER GAUGE - MECHANICAL

Suitable for all vehicles. Illumination 12V included.

Pipe kit not included.

Part no.	Range (bar)	Diameter (mm)
150-035-001G	-1-0 to +1,5	52

VACUUM GAUGE - MECHANICAL

Suitable for most vehicles. Supplied with nuts and cones for 3/16" tubing.
Illumination 12V included.

Pipe kit not included.

Part no.	Range	Diameter (mm)
150-077-005	-30-0" Hg	52

VOLTMETER

Suitable for all engines and machines. **Monitors Charge and battery condition**.
Illumination 12 or 24V included.

Part no.	Range	Voltage (V)	Diameter (mm)
332-030-001C	8-16V	12	52
332-040-001C	18-32V	24	52

PRESSURE SENDERS

OIL PRESSURE SENDERS

WITHOUT WARNING CONTACT - COMMON GROUND

Part no.	Range (kPa)	Thread	Type
360-081-029-004C	500	1/8”x27NPTF	(A)
360-081-029-012C	1000	1/8”x27NPTF	(A)

Refer to your engine manufacturers manual for correct oil pressure ratings.

Note: 500kPa = 72.5 PSI, 1000kPa = 145 PSI

- Rated Voltage (V): 6V to 24V
- Operating Temperature: -25ºC to + 100ºC (up to + 120ºC for 1 hour max. at threaded connector)
- Resistance range: 10Ohm to 184Ohm

(A)

(B)

OIL PRESSURE SENDERS - WITH SWITCH

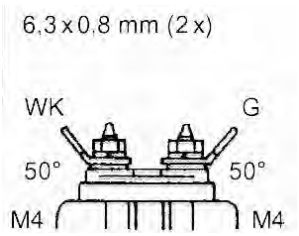
WITH WARNING CONTACT - COMMON GROUND

Part no.	Range (kPa)	Switch Point	Thread	Type
360-081-030-049C	500	40kPa	1/8”x27NPTF	(B)
360-081-030-052C	1000	50kPa	1/8”x27NPTF	(B)
360-081-030-025C	500	40kPa	M18x1.5	(C)
360-081-030-032C	1000	50kPa	M14x1.5	(B)

Note: 500kPa = 72.5 PSI, 1000kPa = 145 PSI

- Rated Voltage (V): 6V to 24V
- Operating Temperature: -25ºC to + 100ºC (up to + 120ºC for 1 hour max. at threaded connector)
- Resistance range: 10Ohm to 184Ohm
- Switching capacity of warning contact: 5W max. non-inductive

(C)



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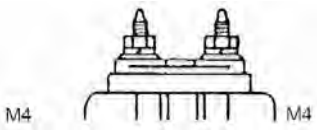


OIL PRESSURE SENDERS - SINGLE STATION

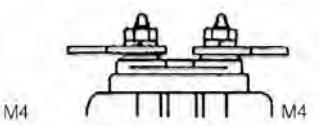
WITHOUT WARNING CONTACT - INSULATED RETURN

Part no.	Range (kPa)	Thread	Type
360-081-032-001C	500	1/8”x27NPTF	(B)
360-081-032-014C	1000	1/8”x27NPTF	(B)
360-081-032-025C	200	1/8”x27NPTF	(C)
360-081-038-002C	2500	3/8”x18NPTF	(F)
360-081-038-003C	2500	1/8”x27NPTF	(E)

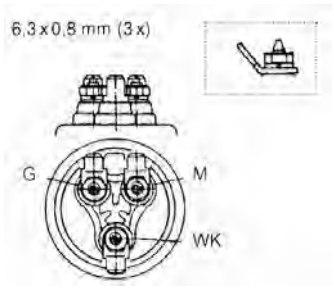
Note: 200kPa = 29 PSI, 500kPa = 72.5 PSI, 1000kPa = 145 PSI, 2500kPa = 362.5 PSI

- Rated Voltage (V): 6V to 24V
- Operating Temperature: -25ºC to + 100ºC (up to + 120ºC for 1 hour max. at threaded connector)
- Resistance range: 10Ohm to 184Ohm
- Overpressure safety: 30 bar or 50 bar max. (short period only for 2 seconds)

(F)



(G)



PRESSURE SENDERS (CONT...)

OIL PRESSURE SENDERS - WITH SWITCH

WITH WARNING CONTACT - INSULATED RETURN

Part no.	Range (kPa)	Switch Point (kPa)	Thread	Type
360-081-039-002C	500	80kPa	1/8"x27NPTF	(G)
360-081-039-003C	1000	80kPa	1/8"x27NPTF	(G)

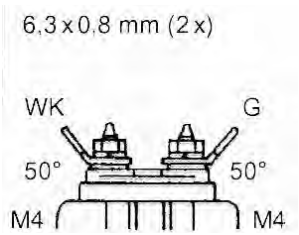
Note: 500kPa = 72.5 PSI, 1000kPa = 145 PSI

- Rated Voltage (V): 6V to 24V
- Operating Temperature: -25ºC to + 100ºC (up to + 120ºC for 1 hour max. at threaded connector)
- Resistance range: 10Ohm to 184Ohm
- Overpressure safety: 30 bar or 50 bar max. (short period only for 2 seconds)
- Switching capacity of warning contact: 5W max. non-inductive

(A)

(B)

(C)



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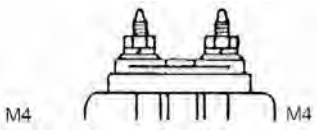

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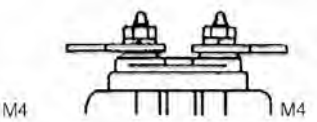

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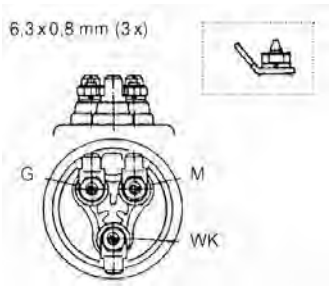


OIL PRESSURE SENDERS - DUAL STATION

WITHOUT WARNING CONTACT - INSULATED RETURN

Part no.	Range (kPa)	Thread	Type
362-081-001-001K	500	1/8"x27NPTF	(F)
362-081-001-002K	1000	1/8"x27NPTF	(F)
362-081-002-001K	2500	1/8"x27NPTF	(F)

Note: 500kPa = 72.5 PSI, 1000kPa = 145 PSI, 2500kPa = 362.5 PSI

- Rated Voltage (V): 6V to 24V

PRESSURE SENDERS (CONT...)

(A)


(E)


(F)


(G)


HEAVY DUTY PRESSURE SWITCH

NON-INSULATED

Part no.	Switch Point (kPa)	Thread	Contacts	Type
230-112-003-013C	70kPa	1/8"x27NPTF	Normally closed	(A)
230-112-003-012C	600kPa	1/8"x27NPTF	Normally closed	(A)
230-112-001-002C	70kPa	1/8"x27NPTF	Normally open	(A)
230-112-001-001C	100kPa	M10x1	Normally open	(A)

Note: 70kPa = 10.15 PSI, 100kPa = 14.50 PSI, 600kPa = 87 PSI

- Rated Voltage (V): 6V to 24V
- Operating Temperature: -25ºC to + 120ºC (up to + 140ºC for 1 hour max. at threaded connector)

INSULATED

Part no.	Switch Point (kPa)	Thread	Contacts	Type
230-112-005-006C	50kPa	M10x1	Normally closed	(A)
230-112-007-005C	30kPa	M14X1.5	Normally closed	(A)
230-112-005-011C	150kPa	M10x1	Normally closed	(A)
230-112-002-001C	50kPa	1/8"x27NPTF	Normally open	(E)

Note: 30kPa = 4.35 PSI, 50kPa = 7.25 PSI, 150kPa = 21.75 PSI

- Rated Voltage: 6V to 24V
- Operating Temperature: -25ºC to + 120ºC (up to + 140ºC for 1 hour max. at threaded connector)

ADJUSTABLE PRESSURE SWITCH

INSULATED

Part no.	Terminal	Adjustable Range (kPa)	Contacts
105-018	Screw	10-100	Close as pressure rises
105-020	Blade	10-100	Close as pressure rises
105-021	Blade	100-1000	Close as pressure rises
105-022	Blade	1000-2000	Close as pressure rises
105-023	Blade	2000-5000	Close as pressure rises
105-024	Blade	10-100	Close as pressure falls
105-025	Blade	100-1000	Close as pressure falls
105-026	Blade	1000-2000	Close as pressure falls
105-027	Blade	2000-5000	Close as pressure falls

Over Pressure Rating up to 30000kPa
Max Voltage (V) 42V-DC
Threads: all M10x1 T

SPEEDOMETERS

SPEEDOMETERS

Floodlit illumination. 12V globe included.

Field adjustable to suit 500 to 400,000 imp/km by pulse setting or auto-calibration function through LCD readout via reset button. Total distance 999,999.9 not resettable. Speed display analogue; Odemeter and trip distance LC-display trip distance 99,999.99 resettable. Signal source Hall effect, inductive or blocking oscillator sender units.

For 24V application use globe **999-065-002** (2 required).
Note: 140mm speedometer Impulse Ratio programmable (1000-60000 pulses/Km (via software).
For matching sender units refer to page 14.

Part no.	Range (km/h)	Diameter (mm)	Voltage (V)
437-035-001C	0-60	80	12/24
437-035-012C	0-80	80	12/24
437-035-002G	0-120	80	12/24
437-035-003C	0-200	80	12/24
437-055-001G	0-60	100	12/24
437-055-002G	0-120	100	12/24
437-015-038C	0-125	140	12
437-025-002C	0-125	140	24

Note: 8 way socket connector part no: Z863103
8 x terminal part no: Z863016

UNIVERSAL SPEED SENDER

A731012

- Blue - Speed Signal
- Green - Negative
- Red - Positive
- 12/24
- Square wave signal
- Cable Length 4M+

SPEED SENSORS

SENSORS - HALL EFFECT

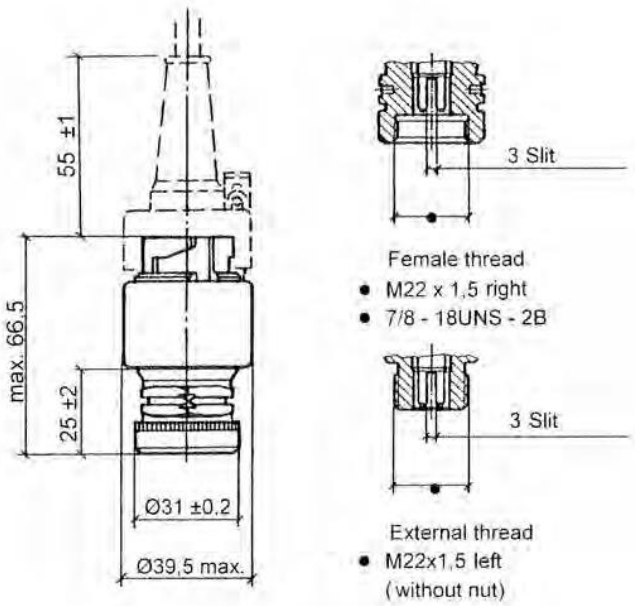
PULSE SENSORS FOR ELECTRONIC TACHOGRAPHS/SPEEDOMETERS 3 BLADE

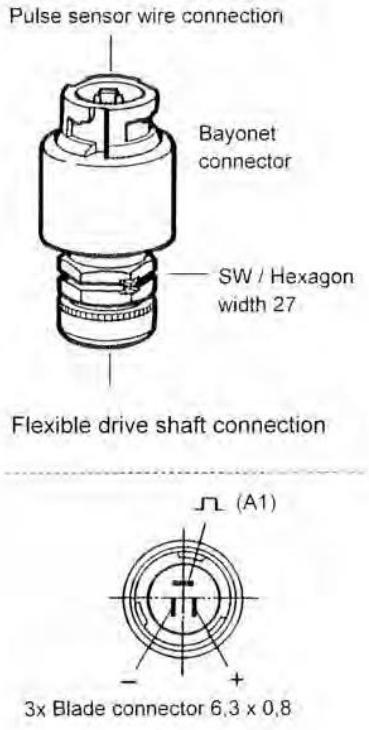
For instruments which require an electrical pulse (**single** pulse) for inquiry of the speed and/or the distance.

Output: single pulse • Pulses/Revolution: 8 (s- and V-pulse)

Pulse Ratio: 30-70%...70-30% • Operating Voltage (V): 6.5V...16V

Part no.	Pulses	Thread
2155-01000000	8	M22x1.5 right (female)
2155-02000000	8	M22x1.5 left (external) no nut
A731012	8	7/8" - 18UNFMale/Female in line
A-SPEC-731 Sender cable connector bayonet plug kit, 3 way spade		





SPEED SENSORS (CONT...)

SENSORS - HALL EFFECT (CONT...)

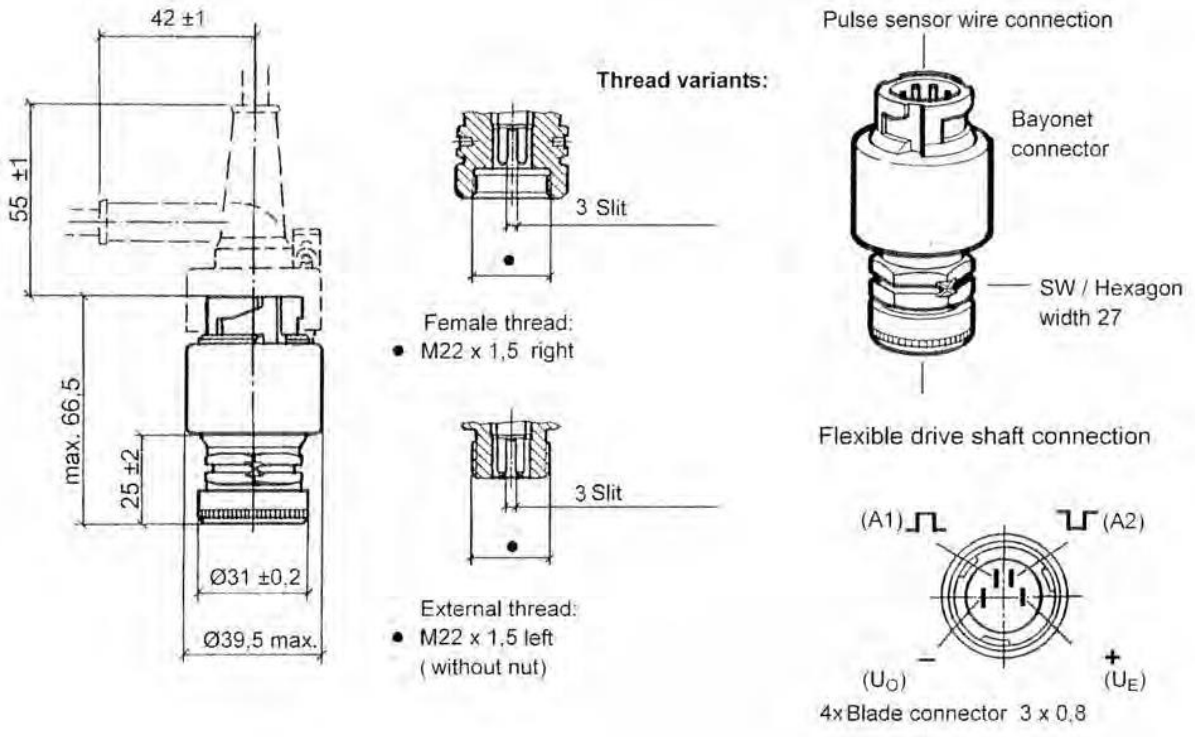
PULSE SENSORS FOR ELECTRONIC TACHOGRAPHS 4 BLADE

For instruments which require an electrical pulse (dual pulse inverse) for inquiry of the speed and/or the distance.

Output: dual pulse inverse • Pulses/Revolution: 8 (s- and V-pulse)

Pulse Ratio: 30-70%...70-30% • Operating Voltage (V): 6.5V...16V

Part no.	Pulses	Thread
2159-01000000	8	M22x1.5 right (female)
2159-02000000	8	M22x1.5 left (external) no nut
A-SPEC-737 Sender cable connector bayonet plug kit, 4 way spade		



SPEED SENSORS (CONT...)

SENSORS - HALL EFFECT

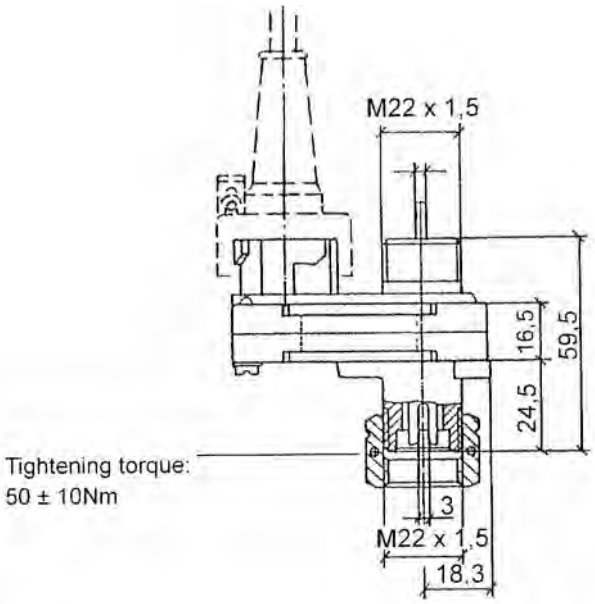
PULSE SENSORS FOR ELECTRONIC TACHOGRAPHS/SPEEDOMETERS

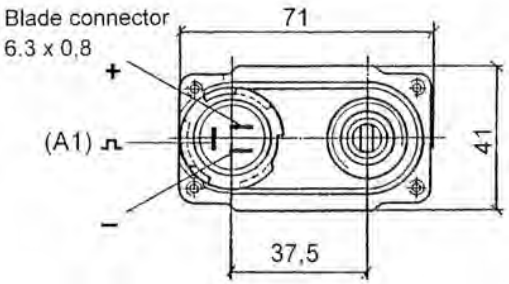
For instruments which require an electrical pulse (single pulse) for inquiry of the speed and/or the distance.
For applications requiring an additional mechanical take-off.

Output: single pulse • Pulses/Revolution: 8 (s- and V-pulse)

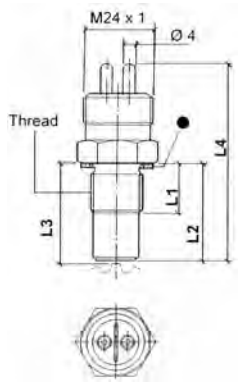
Pulse Ratio: 30-70%...70-30% • Operating Voltage (V): 6.5V...16V

Part no.	Pulses	Thread (Input & Output)
2157-03000000	8	M22x1.5





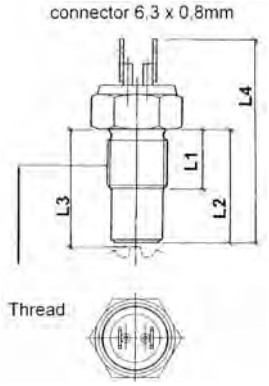
SPEED SENSORS (CONT...)



SENDERS - INDUCTIVE PUSH ON

Electrical connection: 2-pole,insulated return
Rated Voltage (V): independent
Interior Resistance: Ri 1050Ohm ± 100Ohm
Test Voltage (V): 500V
Insulating Resistance: 500kOhm min.

Part no.	Signal	Thread	L1	L2	L3	L4
340-804-005-002C	Sine	M18x1.5	24.9	26.5	27.65	63
340-804-005-007C	Sine	M18x1.5	15	35	36	71
340-804-005-001C	Sine	M18x1.5	18	35	36	71



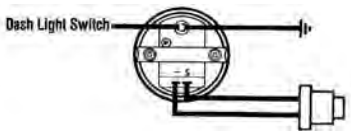
SENDERS - INDUCTIVE BLADE

Electrical connection: 2-pole,insulated return
Rated Voltage (V): independent
Interior Resistance: Ri 1050Ohm ± 100Ohm
Test Voltage (V): 500V
Insulating Resistance: 500kOhm min.

Part no.	Signal	Thread	L1	L2	L3	L4
340-804-006-007C	Sine	M18x1.5	33	34	35	62

GENERATOR SENDER

Part no.	Signal Output	Thread
340-807-001-001C	With distance pulse output	M22x1.5
340-808-001-002G	Output 1.0 Volt AC current per 100rpm	M22x1.5



TACHOURMETER

TACHOURMETERS - ELECTRONIC WITH LCD HOURMETER

Suitable for most petrol and diesel engines. Adjustable through LCD and reset button. Field programmable to 1, 2, 3, 4, 5, 6, 8 or 12cyl./4 stroke, 1, 2, 3 or 4 cyl./2 stroke ignition and alternator pick-up ("W" terminal).
Also suitable for signal from generator or inductive sender unit.
Incorporated hourmeter shows true engine hours.
Operating hours 99,999.9. Pulse range 0.5-200 pulses per rev.
Illumination 12V included.

For 24V application use globe **999-065-002** (2 required).

For matching speed sensors/senders see page 17.

TACHOURMETER

Part no.	Range (rpm)	Diameter (mm)	Voltage (V)
333-035-010G	3000	80	12/24
333-035-011G	4000	80	12/24
333-035-014C	6000	80	12/24
333-055-002G	3000	100	12/24

Note: 8 pin plug required which is not included in kit, PN. **Z2863103**
Terminal PN. **Z2863016** x 8

TACHOMETERS - ELECTRONIC

Suitable for most petrol and diesel engines. Field programmable to suit 4, 6 or 8 cyl./4 stroke ignition and alternator pick-up (Terminal "W"). For 24V application use globe 999-065-002 (2 required).

TACHOMETER

Part no.	Range (rpm)	Diameter (mm)	Voltage (V)
333-035-001G	3000	80	12
333-035-002C	4000	80	12
333-035-003C	7000	80	12
333-035-017G	6000	52	12
333-035-018G	8000	52	12
333-035-022C	10000	80	12
333-045-002C	4000	80	24
333-055-001G	3000	100	12
333-065-001G	3000	100	24
333-065-001G	3000	80	24

Note: 8 pin plug required which is not included in kit, PN. **Z2863103**.
Terminal PN. **Z2863016** x 8

TEMPERATURE GAUGES

TEMPERATURE GAUGES - ELECTRIC

Suitable for most vehicles and machines. Illumination 12 or 24V included.
For other sender units please refer to page 22

TEMPERATURE GAUGES -WATER

Part no.	Range (ºC)	Diameter (mm)	Voltage (V)
310-030-002C	40-120	52	12
310-040-002C	40-120	52	24

With ISO symbol. 40-120ºC = 100-250ºF

SENDER ONLY

Part no.	Range (ºC)	Thread	Terminal
323-801-005-001D	40-120	1/8-27NPTF	Button

SENDER/SWITCH COMBINATION

Part no.	Range (ºC)	Thread	Switch Point (ºC)
323-803-001-011D	40-120	5/8" 18UNF	95
323-803-001-016D	40-120	M14x1.5	94
323-803-001-001D	40-120	M14x1.5	100

40-120ºC = 100-250ºF

For other sender units please refer to page 22

Engine Block Adapters are listed on page 130

TEMPERATURE GAUGES - ENGINE OIL

Part no.	Range (ºC)	Diameter (mm)	Voltage (V)
310-030-003C	50-150	52	12
310-040-003C	50-150	52	24

With ISO symbol. 50-150ºC = 120-300ºF

SENDER ONLY

Part no.	Range (ºC)	Thread	Switch Point
323-801-009-001D	50-150	1/8-27NPTF	Button

SENDER/SWITCH COMBINATION

Part no.	Range (ºC)	Thread	Switch Point (ºC)
323-803-002-002D	50-150	M14X1.5	120ºC
323-803-002-007D	50-150	M14X1.5	120ºC
323-803-014-002D	50-150	M14X1.5	130ºC

TEMPERATURE GAUGES (CONT...)

TEMPERATURE GAUGE - CYLINDER OIL

CYLINDER HEAD - AIR COOLED ENGINE

Part no.	Range (ºC)	Diameter (mm)	Voltage (V)
310-030-004C	60-200	52	12
310-040-004C	60-200	52	24

With ISO symbol. 60-200ºC = 140-392ºF

SENDER ONLY

Part no.	Range (ºC)	Thread	Terminal
323-801-003-001D	60-200	M10x1.5	Button
323-801-028-001C	60-200	M14x1.5	Screw

TEMPERATURE GAUGES - MECHANICAL

Suitable for most vehicles and machines. Process connection is 1/8" - 27NPTF threaded removable thermowell. Temperature is transmitted via capillary tube. Coil up excess capillary tubing - do not cut to shorten! Illumination globe holder not included.

For 24V application use globe 999-065-002
For 12V application use globe 999-065-001
Globe Holder part no. 999-067-001

TEMPERATURE GAUGE (WATER GAUGE)

Part no.	Range (ºC)	Diameter (mm)	Capillary length (mm)
180-035-002G	40-120	52	1600
180-035-004G	40-120	52	2600
180-035-005G	40-120	52	4000
180-035-006G	40-120	52	6000
180-035-008G (oil)	50-150	52	2600

ACCESSORIES

Part no.	Description	Thread
1-801-078	Block Adapter	1/8x27NPTF

Note: Suitable for all the above temperature gauges.

Other engine block adaptors are listed on page 130

TEMPERATURE GAUGES (CONT...)

TEMPERATURE EXHAUST/PYROMETER - ELECTRIC

Suitable for most exhaust systems.
Thermocouple connection is by 1/4" - 18NPTF compression fitting.
Illumination 12V included.

PYROMETER ELECTRONIC KIT

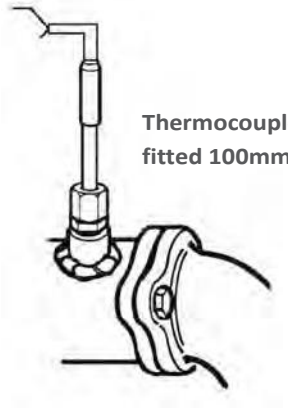
Part no.	Range	Diameter (mm)	Voltage (V)
397-015-003	0-900ºC (37.6mV@900ºC)	52	12

Complete Kit - consisting of instrument and thermocouple, 5M loom and weld boss.

ACCESSORIES

Part no.	Description
N03-320-264	Sender
N03-320-266	Weld Boss
N03-320-268	Cable 4M

See page 131 for Bezel options.



Thermocouple should be fitted 100mm after turbo

TEMPERATURE SENDERS

SENDERS - TO SUIT VDO INSTRUMENTS 40º-120ºC

The senders listed hereunder are for use with all instruments listed in this publication. Selection is simple: just match the range of the instrument with the range of the sender unit.

WATER TEMPERATURE SENDERS

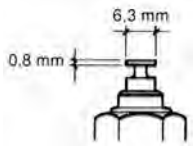
To suit all VDO temperature gauges with range 40º-120ºC

Related Voltage (V): 6V to 24V
Temperature response time: 3 minutes minimum after switching on operating current.

Part no.	Range (ºC)	Thread	Type
323-801-005-001D	40-120	1/8x27NPTF	(A)
323-801-001-016D	40-120	1/2-14NPTF	(B)
323-801-001-026N	40-120	M14x1.5	(B)

40-120ºC = 100-250ºF

(A)



(B)

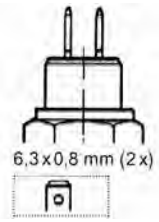
WATER TEMPERATURE SENDERS WITH SWITCH

Contact rating 3 watt

Related Voltage (V): 6V to 24V
Temperature response time: 3 minutes minimum after switching on operating current.

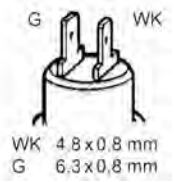
Switching capacity: 1.2W to 3W non-inductive
Break Point: 5ºC max. below make point
Contacting Mode: slow-acting
Type of contact: Switch closes at switch point

(C)



Part no.	Range (ºC)	Switch Point (ºC)	Thread	Type
323-803-001-004D	40-120	90ºC, NO	M14x1.5	(D)
323-803-001-016D	40-120	94ºC, NO	M14x1.5	(D)
323-803-001-011D	40-120	95ºC, NO	5/8-18UNF	(D)
323-803-001-001D	40-120	100ºC, NO	M14x1.5	(D)
323-803-004-001D	40-120	100ºC, NO	M14x1.5	(E)
323-803-004-002D	40-120	105ºC, NO	M14x1.5	(E)
323-803-001-013D	40-120	106ºC, NO	M14x1.5	(D)

(D)



40-120ºC = 100-250ºF
Note: NO = Normally open - contact closes at switch point

(E)

TEMPERATURE SENDER UNIT

Insulated return - Singlestation

Related Voltage (V): 6V to 24V
Temperature response time: 3 minutes minimum after switching on operating current.

(F)

Part no.	Range (ºC)	Thread	Type
323-805-001-001K	40-120	M14x1.5	(C)
323-805-001-002	40-120	5/8-18UNF	(C)

TEMPERATURE SENDERS (CONT...)

SENDERS - TO SUIT VDO INSTRUMENTS 40º-120ºC (CONT...)

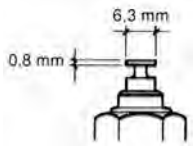
TEMPERATURE SENDER UNIT

Insulated return - Dualstation

Related Voltage (V): 6V to 24V
Temperature response time: 3 minutes minimum after switching on operating current.

Part no.	Range (ºC)	Thread	Type
325-805-003-001	40-120	1/4-18NPTF	(C)

(A)



SENDERS - TO SUIT VDO INSTRUMENTS 50º-150ºC

The senders listed hereunder are for use with all instruments listed in this publication.

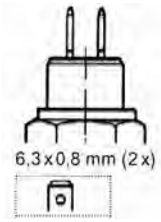
Selection is simple: just match the range of the instrument with the range of the sender unit.

(B)

OIL TEMPERATURE SENDER ONLY

To suit all VDO temperature gauges with range 50º-150ºC
Related Voltage (V): 6V to 24V
Temperature response time: 3 minutes minimum after switching on operating current.

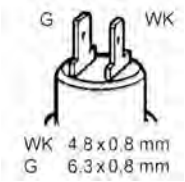
(C)



Part no.	Range (ºC)	Thread	Type
323-801-009-001D	50-150	1/8-27NPTF	(A)
323-801-010-003D	50-150	M12x1.5	(A)
323-801-004-002N	50-150	M14x1.5	(F)

50-150ºC = 120-300ºF

(D)



SENDER/SWITCH COMBINATION

Related Voltage (V): 6V to 24V

Temperature response time: 3 minutes minimum after switching on operating current.

(E)

Switching capacity: 1.2W to 3W non-inductive
Break Point: 5ºC max. below make point
Contacting Mode: slow-acting
Type of contact: Switch closes at switch point

(F)

Part no.	Range (ºC)	Switch Point (ºC)	Thread	Type	Resistance Output
323-803-014-002D	50-150	130ºC, NO	M14x1.5	(D)	130ºC = 33,49ohm
323-803-002-007D	50-150	130ºC, NO	M14x1.5	(D)	130ºC = 28,81ohm
323-803-002-002D	50-150	120ºC, NO	M14x1.5	(D)	120ºC = 36,51ohm

50-150ºC = 120-300ºF
Note: NO = Normally open - contact closes at switch point

TEMPERATURE SENDERS (CONT...)

SENDERS - TO SUIT VDO INSTRUMENTS 50º-150ºC (CONT...)

TEMPERATURE SENDER UNIT

Insulated Return

Related Voltage (V): 6V to 24V
Temperature response time: 3 minutes minimum after switching on operating current.

Part no.	Range (ºC)	Thread	Type
323-805-003-001N	50-150	M14x1.5	(C)

50-150ºC = 120-300ºF

TEMPERATURE SWITCHES - INSULATED RETURN

Rated Voltage (V): 6V to 12V.
Switching Capacity: 100/120W.
Make Point: Contact close as temperature rises.
Break Point: Contact open as temperature falls.
2-fold blade x 0.8DIN 46244

Part no.	On (ºC)	Off (ºC)	OP. Max (ºC)	Thread
X10-232-001-001+	64	60	110	M14x1.5
X10-232-001-002*	82	74	110	M14x1.5
X10-232-001-007*	96	92	110	M14x1.5

+ Switching capacity 120W

* Switching capacity 100W

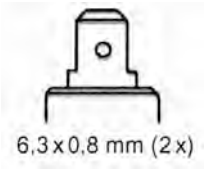
TEMPERATURE SENDERS (CONT...)

TEMPERATURE SWITCHES - COMMON GROUND

Rated Voltage (V): 6V to 12V.
Switching Capacity: 1.2W to 3W non-inductive.
Type of contact: Contact closes at switch point.
Contacting mode: slow-acting.
Break Point: 5ºC max. below make point.

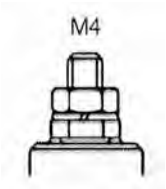
Part no.	Switch Point (ºC)	OP. Max (ºC)	Thread	Type
232-011-017-087D	40	120	M14x1.5	(B)
232-011-017-038D	55	120	M14x1.5	(A)
232-011-017-040D	70	120	M14x1.5	(A)
232-011-017-017D	85	120	M14x1.5	(A)
232-011-005-003D	90	120	M10x1.5	(C)
232-011-005-019D	96	120	1/8-27NPTF	(C)
232-011-017-034D	100	160	M14x1.5	(A)
232-011-017-135D	102	150	M14x1.5	(B)
232-011-017-010D	110	160	M14x1.5	(A)
232-011-017-032D	120	130	M14x1.5	(A)
232-011-005-017D	150	200	M10x1.5	(C)
232-011-005-004D	170	220	M10x1.5	(C)
232-011-005-030D	185	230	M10x1.5	(D)
232-011-019-003D	195	250	M10x1.5	(C)

(A)



(B)

(C)



(D)

FUEL TANK - LEVER TYPE

INSTALLATION INSTRUCTIONS

Parts List

Item	Description	Qty
1.	Fuel Level Sender	1
2.	Float Arm	1
3.	Gasket	1
4.	Fitting Instructions	1

Note: Mounting Flange P/N 1403145
(Must be ordered separately)

CAUTION:
Read these instructions carefully before installation.

- VDO recommends that the fuel sender and the fuel gauge be wired together and checked for compatibility prior to installing fuel sender into tank.
- Do not deviate from assembly or wiring instructions.
- Always disconnect positive battery lead before making any electrical connections.
- When making modifications to fuel tanks, remove the tank from the vehicle and empty, clean and dry the tank.
- Before drilling any holes into the tank, place the sender assembly on top of the tank to judge proper hole placement allowing float arm clearance inside of tank.
- After drilling, make sure all chips and other foreign matter have been removed from the tank.

Fuel Sender Ohms Range:

Part no. 220.003 Empty = 10 Ohms - Full 180 Ohms
Refer to the Siemens VDO Catalogue for matching fuel gauges.

The unit can be adjusted to read accurately in tanks from 150mm to 600mm deep. For sender adjustment, refer to Table 1 and Fig.1 on pages 21-22

CALLIBRATION and INSTALLATION

Tank unit depths of 150mm to 600mm - No disassembly of the sender bracket is necessary.

From Table 1:

H = Tank unit height
L = body length "g" & "f"
R = arm length from "b" point to float centre.

1. Using Table 1, check tank depth size on "H" column and corresponding "L" & "R"
2. Loosen the two screws "d" and adjust the plastic housing up or down until the proper dimension "L" is obtained, then re-tighten screws securely.

Float Arm Installation:

1. To install the float arm assembly, loosen screw "h", remove the short piece of rod, and discard it.
2. Insert the float rod until the proper length "R" from Table 1 is met, then tighten the screw securely.
3. Allow 25mm to protrude out from the "h" point (opposite of the float arm) see Fig 2 on page 22.
4. Carefully cut off any excess rod with a bold cutter or similar tool, taking care not to damage the assembly.

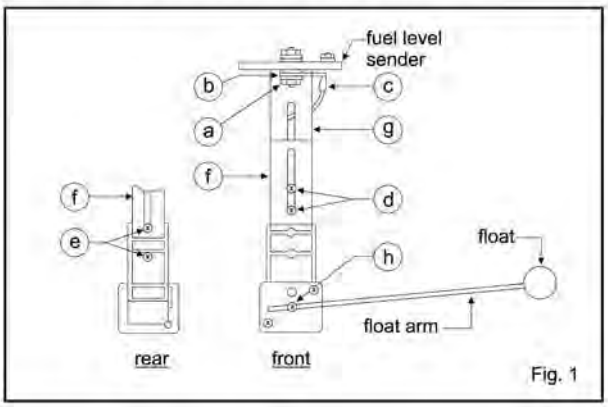


Fig. 1

Tank unit depths below 400mm

1. Remove two screws "d" and discard.
2. Remove two screws "e" from the plastic housing and reserve for later use.
3. Carefully remove bracket "f" from the plastic housing and discard it.
4. Replace bracket "f" with bracket "g" in the housing and loosely re-install the two screws "e" into housing.
5. Using Table 1, check tank depth size on "H" column and corresponding "L" & "R".
6. Slide housing up or down until dimension "L" is reached, then tighten screws securely.
7. To install the float arm assembly, loosen screw "h", remove the short piece of rod, and discard it.
8. Insert the float rod until the proper length "R" from Table 1 is met, then tighten the screw securely.
9. Allow 25mm to protrude out from the "h" point (opposite of the float arm) see Fig 2.
10. Carefully cut off any excess rod with a bolt cutter or similar tool, taking care not to damage the assembly.

Note:
Make sure the float is installed as shown in Fig.1. If installed backwards, the fuel gauge will indicate "full" when the tank is empty, and "empty" when the tank is full.

WARRANTY

The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

FUEL TANK - LEVER TYPE (CONT...)

INSTALLATION INSTRUCTIONS

Fuel sender installation inside the tank

To install the tank unit sender into the fuel tank using a flange kit:

1. Refer to Fig. 3 and slide the rubber gasket up to the bottom of the fuel sender flange.
   Next, slide the second flange over fuel sender to bottom of rubber gasket.
   Align the pre-threaded holes in mounting flange and rubber gasket with those in fuel sender flange.
   Use 25mm screw to loosely attach mounting flange.
   Do not tighten completely.
2. Refer to Fig. 4 and slip the fuel sender assembly into the 59mm hole in the tank, turning until it goes into the tank.
3. Tighten all screws until flange is fully seated onto the gasket.
4. Hook up gauge sensor wire to center stud terminal.
5. Hook up ground wire to small terminal.

Welding Flange Application
Cut a 43mm hole in the top of the tank.

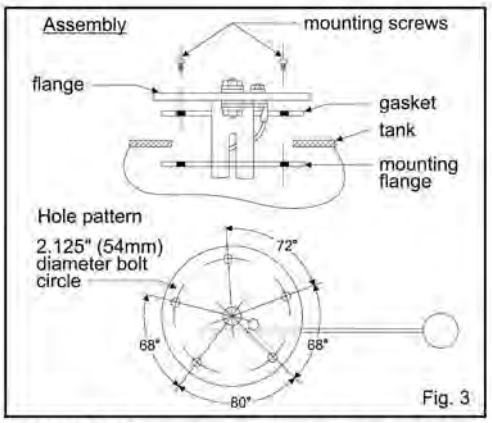


Fig. 3

CAUTION: Make certain float arm has a clear field of motion before tightening screws in flange assembly.

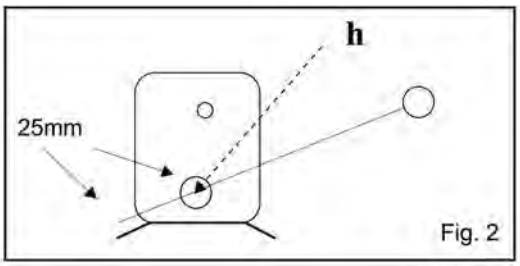


Fig. 2

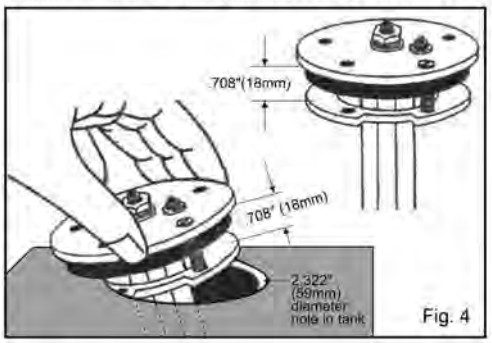


Fig. 4

Table 1 (Dimensions in mm)

H	L	R
160	80	94
165	82.5	97
170	85	100
175	87.5	103
180	90	106
185	92.5	109
190	95	112
195	97.5	115
200	100	118
205	102.5	121
210	105	124
215	107.5	127
220	110	130
225	112.5	133
230	115	136
235	117.5	139
240	120	142
245	122.5	145
250	125	148
255	127.5	151
260	130	154
265	132.5	157

H	L	R
270	135	160
275	137.5	163
280	140	166
285	142.5	169
290	145	172
295	147.5	175
300	150	178
305	152.5	181
310	155	184
315	157.5	187
320	160	190
325	162.5	193
330	165	196
335	167.5	199
340	170	202
345	172.5	205
350	175	208
355	177.5	211
360	180	214
365	182.5	217
370	185	220
375	187.5	248

H	L	R
380	190	252
385	192.5	256
390	195	260
395	197.5	264
400	200	268
405	202.5	272
410	205	276
415	207.5	280
420	210	284
425	212.5	288
430	215	292
435	217.5	296
440	220	300
445	222.5	304
450	225	308
455	227.5	312
460	230	316
465	232.5	320
470	235	324
475	237.5	328
480	240	332
485	242.5	336

H	L	R
490	245	340
495	247.5	344
500	250	348
505	252.5	352
510	255	356
515	257.5	360
520	260	364
525	262.5	368
530	265	372
535	267.5	376
540	270	380
545	272.5	384
550	275	388
555	277.5	392
560	280	396
565	282.5	400
570	285	404
575	287.5	408
580	290	412
585	292.5	416
590	295	420
595	297.5	424

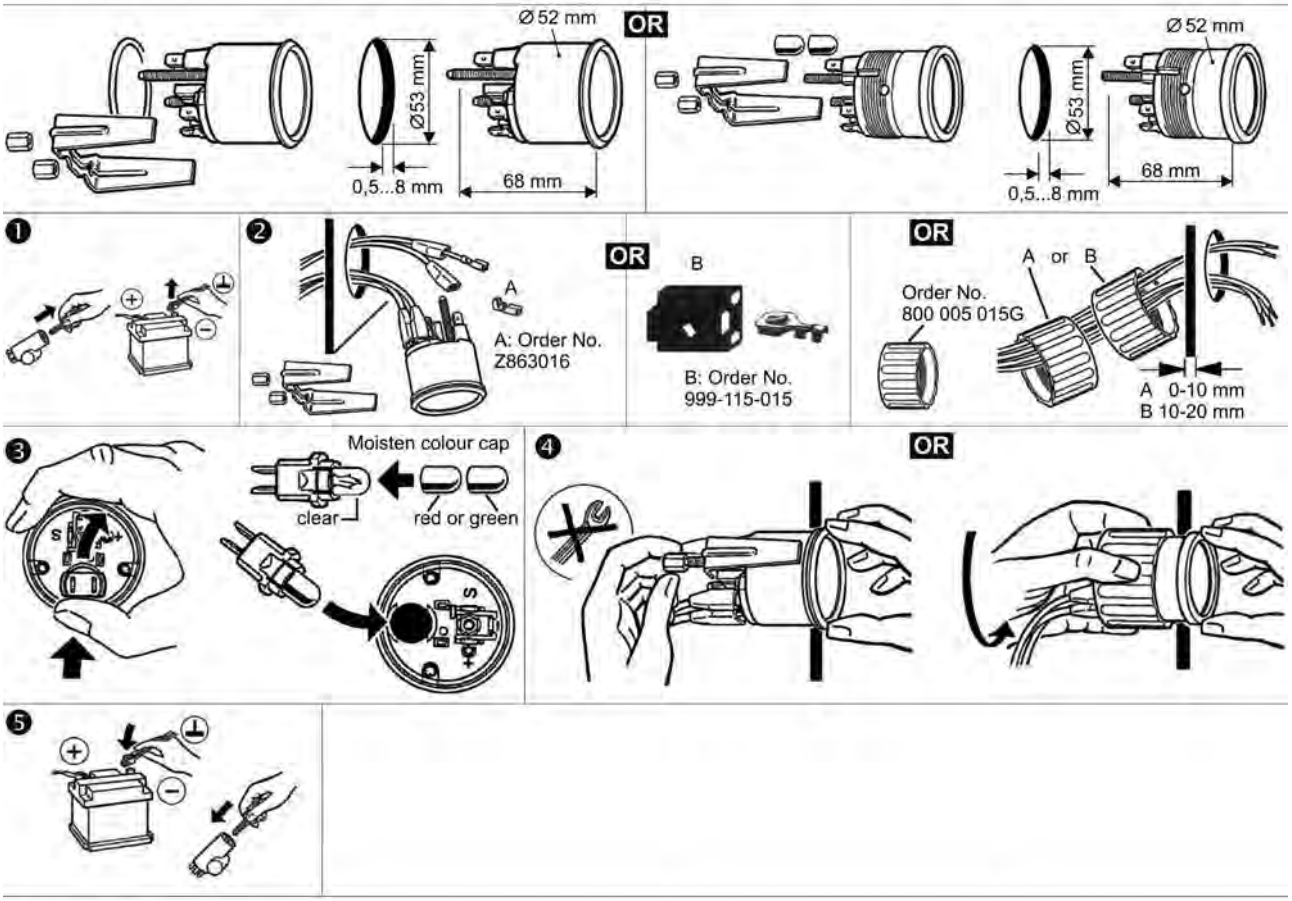
Add 25mm to all values of "R"

FUEL GAUGE - TUBULAR TYPE

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)



WARRANTY

The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

FUEL TANK - TUBULAR TYPE, SENSOR INSTRUCTIONS

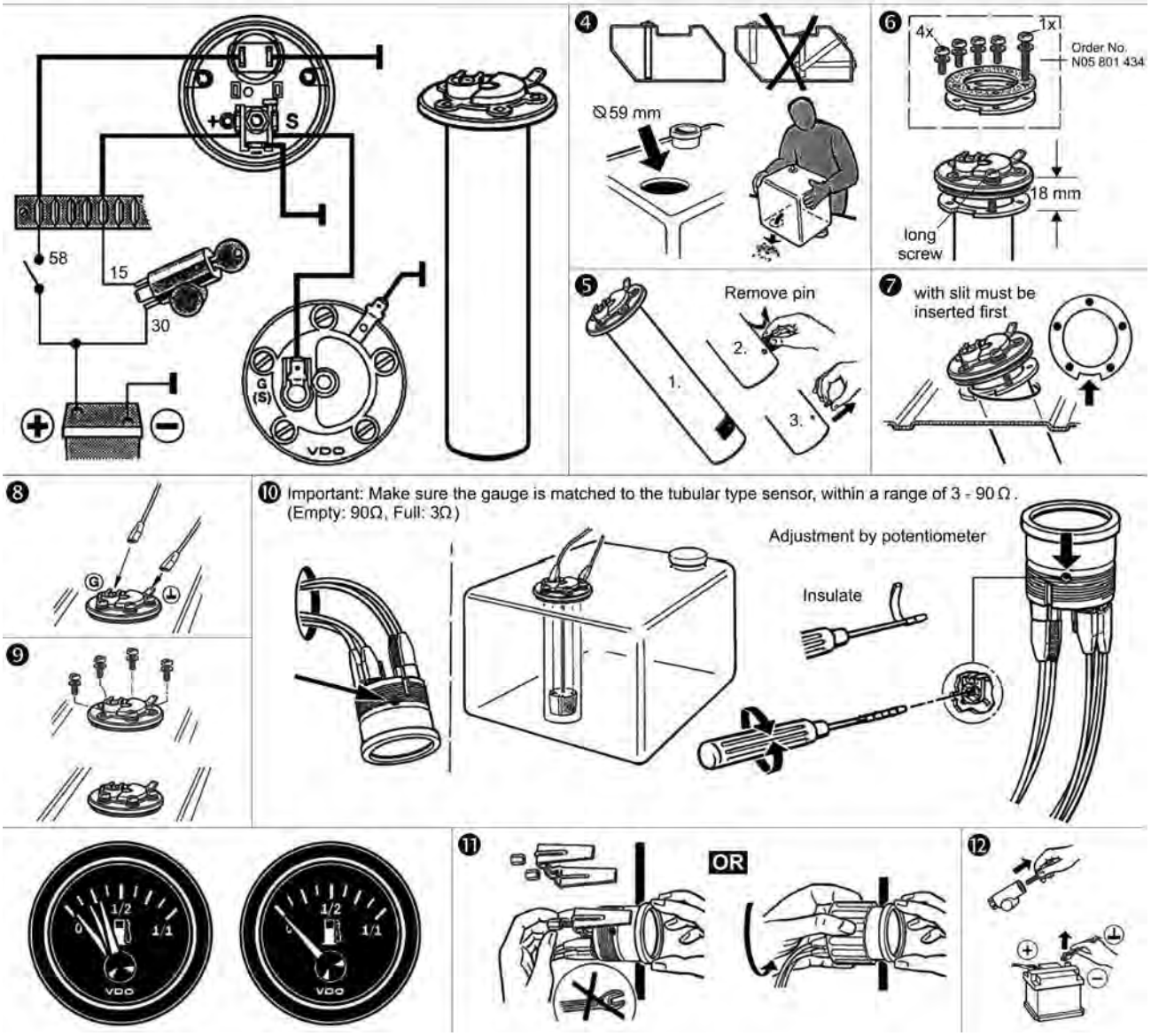
SENSOR INSTALLATION

Sensor Installation Location

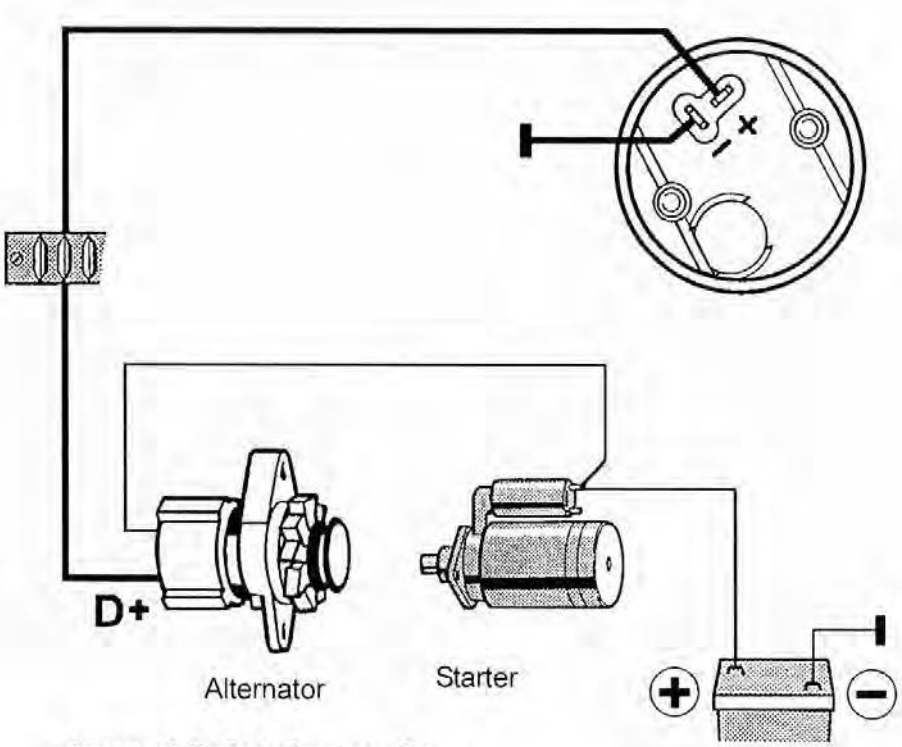
Install sensor in the place provided by the automobile manufacturer in the coolant circulation system (e.g. in place of the temperature warning switch) or in the coolant hose.

Safety Instructions

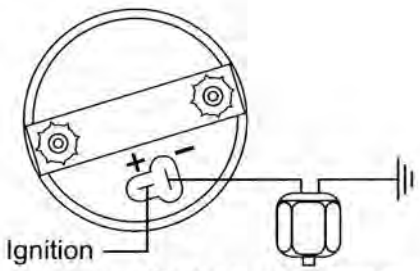
- ✓ Only install the sensor when the engine is cold.
- ✓ Replace any coolant lost during installation process, to the correct level and composition specified by the automobile manufacturer.
- ✓ Make sure that the correct amount of torque is applied (Nm max.) See table below.



HOURMETER



Normal Safety Instructions



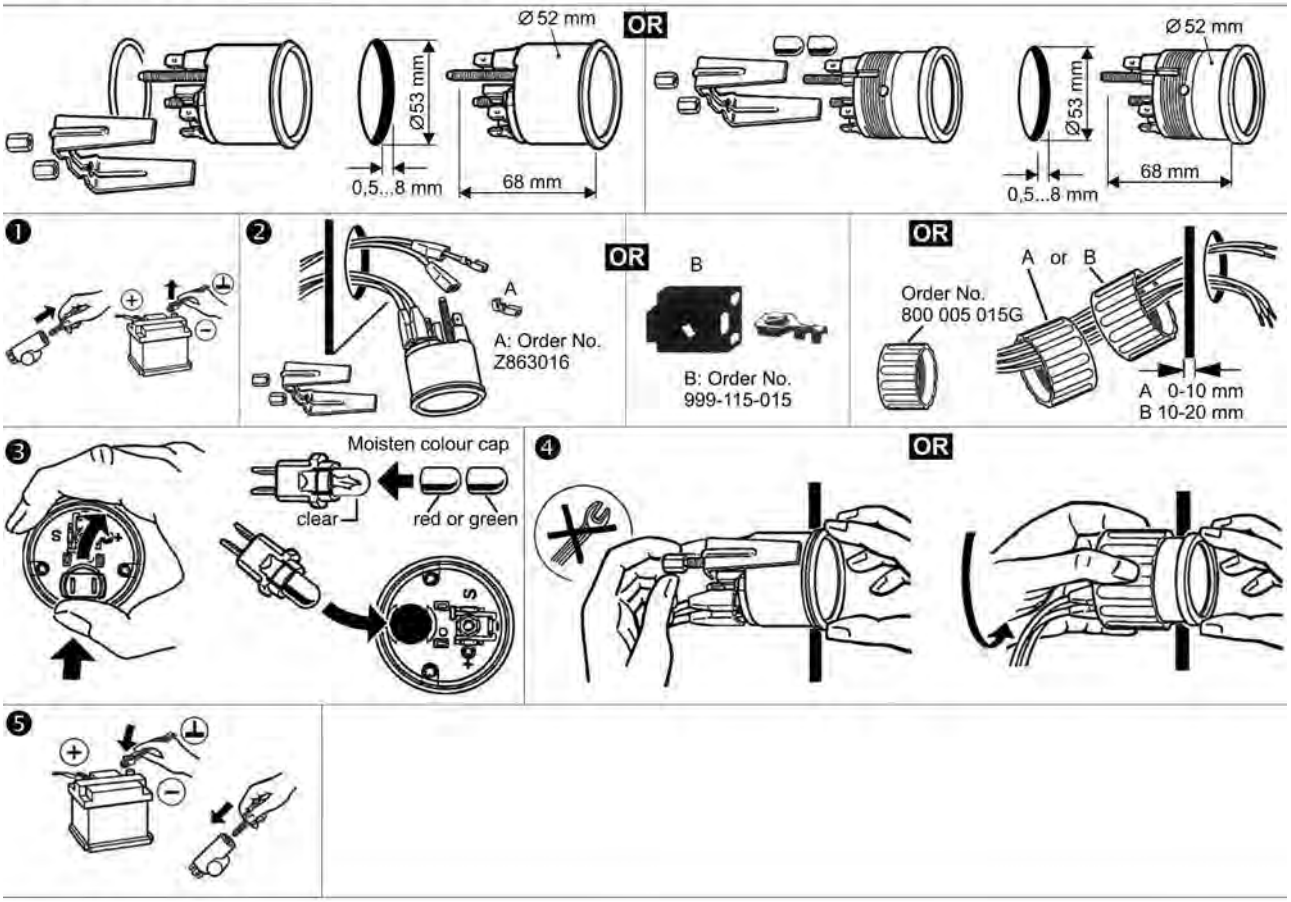
Pressure Switch Application

OIL PRESSURE GAUGE

INSTALLATION INSTRUCTIONS

Safety Instructions

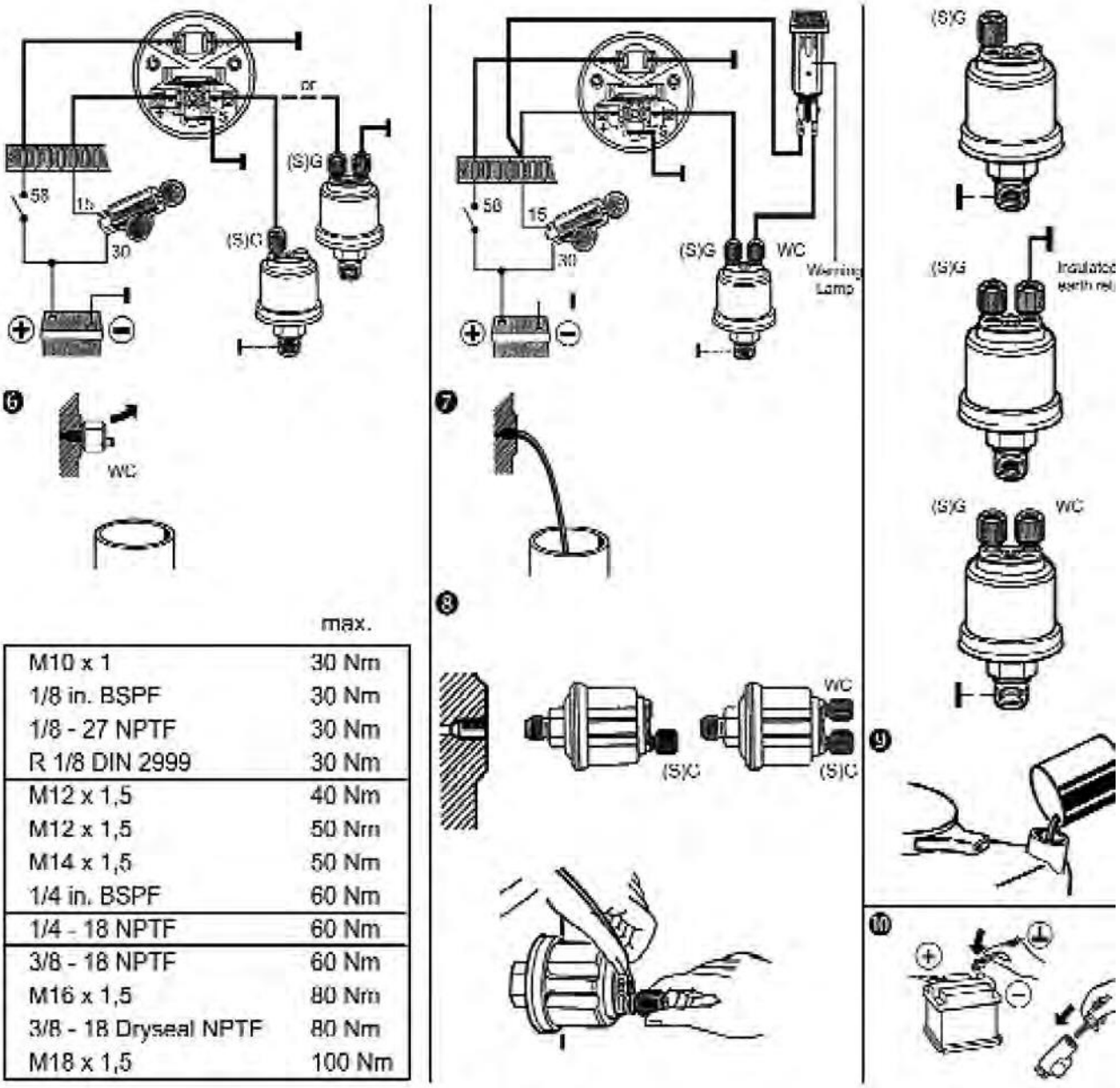
- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)



WARRANTY

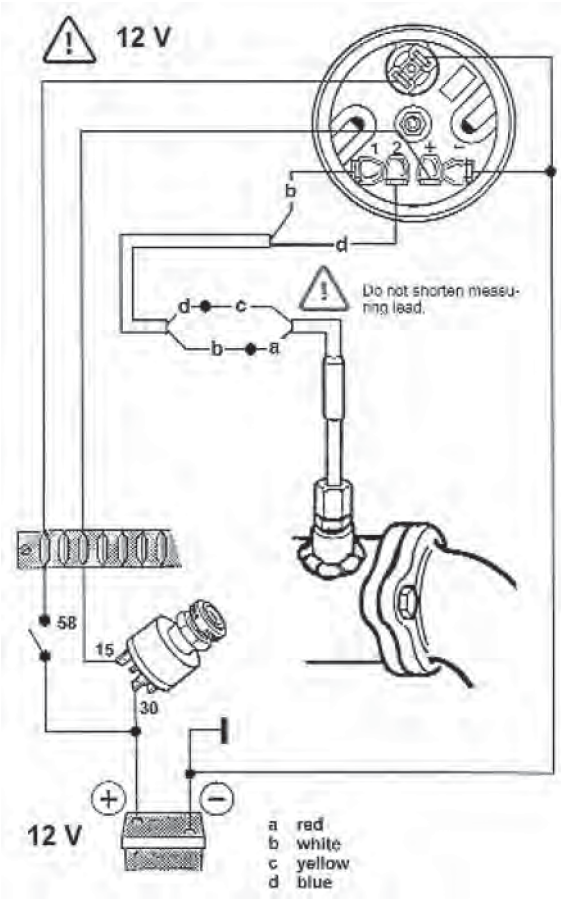
The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

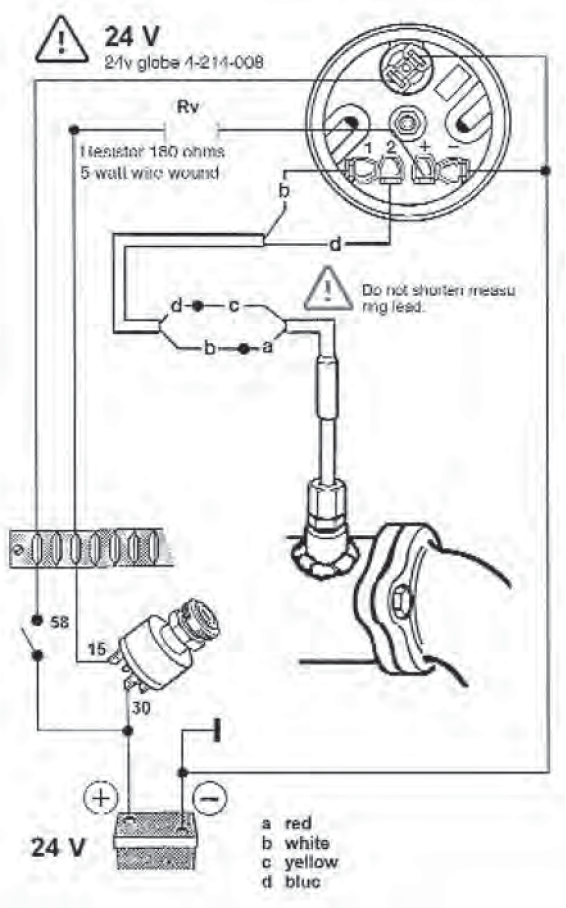
OIL PRESSURE GAUGE - SENSOR INSTALLATION



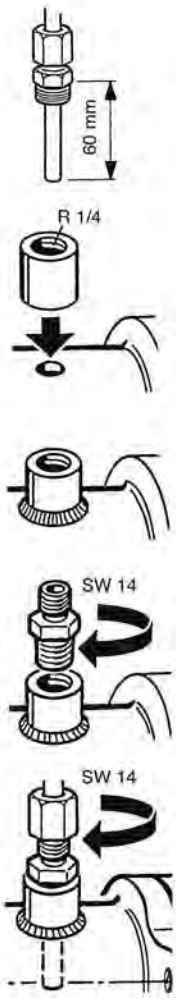
	max.
M10 x 1	30 Nm
1/8 in. BSPF	30 Nm
1/8 - 27 NPTF	30 Nm
R 1/8 DIN 2999	30 Nm
M12 x 1,5	40 Nm
M12 x 1,5	50 Nm
M14 x 1,5	50 Nm
1/4 in. BSPF	60 Nm
1/4 - 18 NPTF	60 Nm
3/8 - 18 NPTF	60 Nm
M16 x 1,5	80 Nm
3/8 - 18 Dryseal NPTF	80 Nm
M18 x 1,5	100 Nm

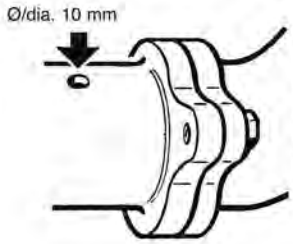
PYROMETER


12 V
1 2 + −
b
d
d c
b a
Do not shorten messu-
ring lead.
58
15
30
12 V
a red
b white
c yellow
d blue

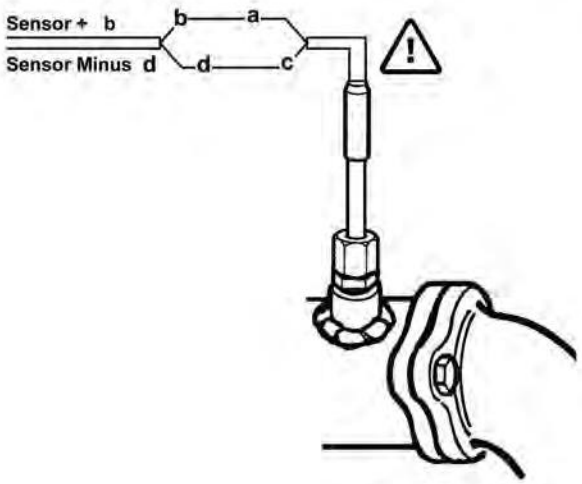

24 V
24v globe 1-214-008
Rv
Resistor 180 ohms
5 watt wire wound
1 2 + −
b
d
d c
b a
Do not shorten messu
ring lead.
58
15
30
24 V
a red
b white
c yellow
d blue

PYROMETER



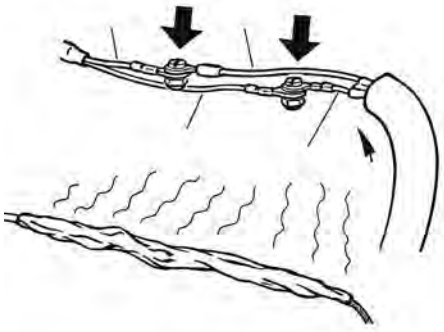


Install the sensor in the exhaust pipe near the elbow flange. Maximum adjustment depth up to the middle of exhaust pipe: 60 mm.
Mount the bushing centrically and weld on. The weld must form a tight seal. Always follow the safety instructions and advice of the welding equipment manufacturer.



Do not shorten measuring lead.

a red
b white
c yellow
d blue



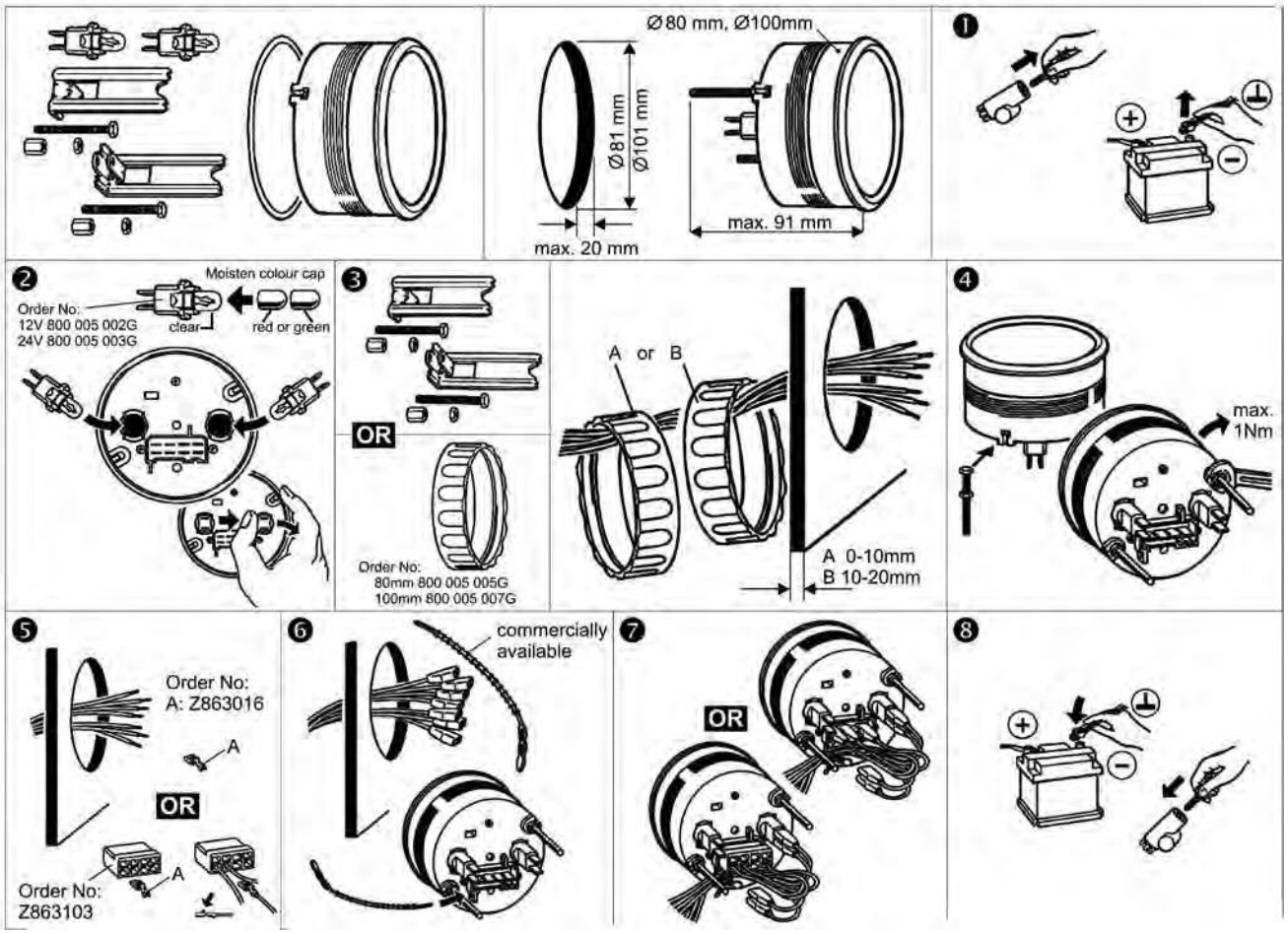
Slide the heat-shrinkable sleeve over the cable connections and then heat with a hot-air fan over the entire length until it shrinks. Always follow the safety advice of the hot-air fan manufacturer.

SPEEDOMETER - ELECTRONIC 80 -100MM

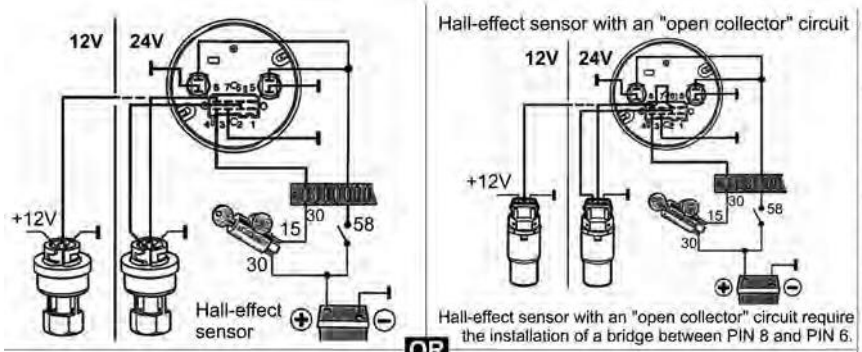
INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)

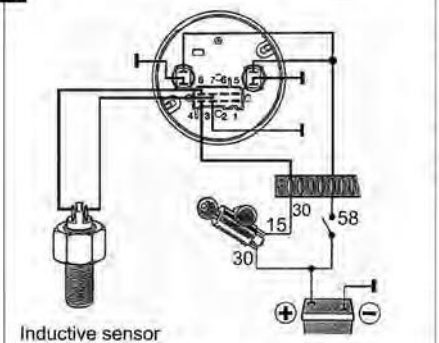


SPEEDOMETER - ELECTRONIC 80 -100MM (CONT...)



Hall-effect sensor with an "open collector" circuit

Hall-effect sensor with an "open collector" circuit require the installation of a bridge between PIN 8 and PIN 6.



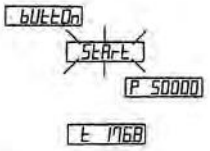
9 Calibration

After selection of the function 'AUtOCL' the display changes to 'bUttOn' after three seconds.

CAUTION:
Ask the passenger to do the calibration!
No speed is displayed during the measuring drive!

Start the vehicle and drive to measuring track. Exactly at the beginning of the track, push the button briefly. The display flashes 'StArt'. Drive the test track at a constant speed. Exactly at the end of the measuring track, again press the button briefly. The determined pulse/distance ratio is displayed if it is between 500 and 399 990 pulses (e.g. P 50 000, which corresponds to pulse/distance ratio 50 000). The calibration is completed if the display changes to total or partial distance display.

Repeat the calibration if the display flashes 'F00' (no pulses). The sequence is the same as described above.



Operation

max. 9999999

Total Distance

The total distance function counts the kilometers or miles travelled up to a maximum of 999 999.9. This display cannot be reset.

You may select the function desired by pressing the pushbutton briefly.

t 1768

t 00 **2 Sec.**

max. t99999

Partial Distance

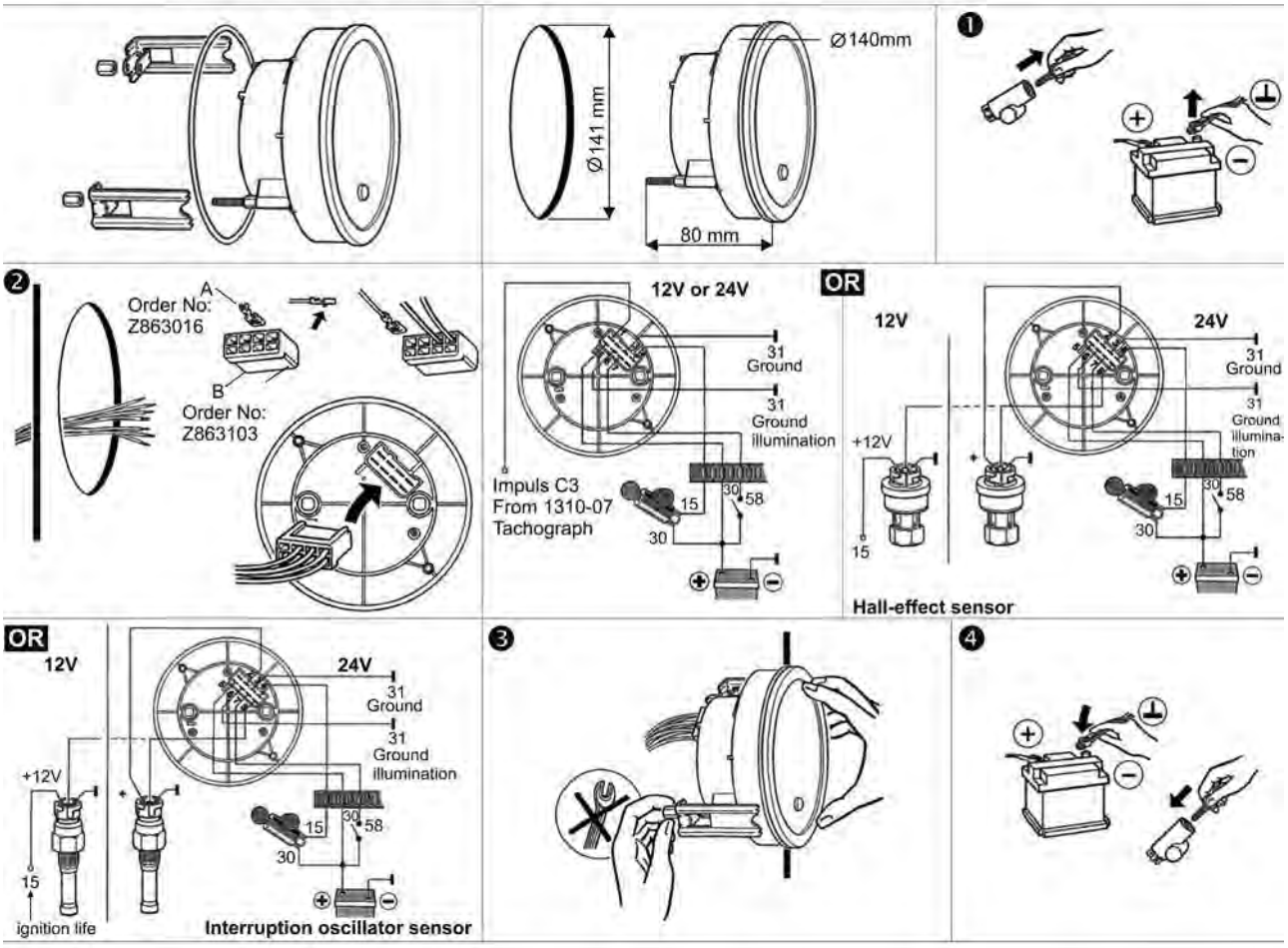
The partial distance is indicated by the symbol "t" in the left section of the display. The kilometers or miles travelled are indicated up to a maximum of 9999.9.
The partial distance is set to 0 by pressing down the pushbutton for longer than 2 seconds.
Note: The partial distance is reset when the total distance is also being displayed by pressing the pushbutton down for longer than 2 seconds.

SPEEDOMETER - ELECTRONIC 140MM (CONT...)

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)



SPEEDOMETER - ELECTRONIC 140MM (CONT...)

❺ Setting the vehicle-specific impulse ratio

To adjust the vehicle-specific impulse ratio, switch off 30 and 15, and then switch them on again:

1. Pull the instrument plug out.
2. Keep the button at the front pressed.
3. Switch on ignition and plug connection plug in again.

- After approximately 3 seconds the indication 8000 appears.
- The vehicle-specific impulse ratio can now be set (range adjustable from 1000 to 60000).
- To change the ratio by 10 impulses per km or mile, press the button briefly.
- To change the ratio by 100 impulses per km or mile, keep the button pressed.
- The set ratio is stored instantly.
- To return to normal mode, switch the ignition off and on again.

Note:

Respect the tolerances per directive 75/443/EEC when calibrating the speed indication. In Germany a reference to them is made in §57 StVZO, chapter 4, which states:

- The vehicle is tested at the following speeds:40 km/h, 80 km/h and 120 km/h or 80% of the maximum speed specified by the manufacturer if it is lower than 150km/h.
- The error limit of the instrument used for the measurement of the effective vehicle speed shall not exceed ±1%.
- If a measuring track is used, it shall be level and dry, and have a sufficiently non-skid surface.
- The displayed speed shall never be lower than the effective speed. At the speeds specified above, and at the intermediate values, the difference of speed V1 displayed by the speedometer and effective speed V2 shall have the following equation:

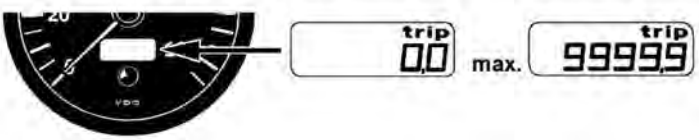
$$0 \leq V1 - V2 \leq \frac{V2}{10} + 4\text{km/h}$$

❻ Total Distance

The total distance function counts the kilometers or miles travelled up to a maximum of 999 999. This display cannot be reset.

❼ Trip Distance

The kilometers or miles travelled are indicated up to a maximum of 9999.9. The trip distance is set to 0 by pressing the button down for longer than 2.5 seconds.

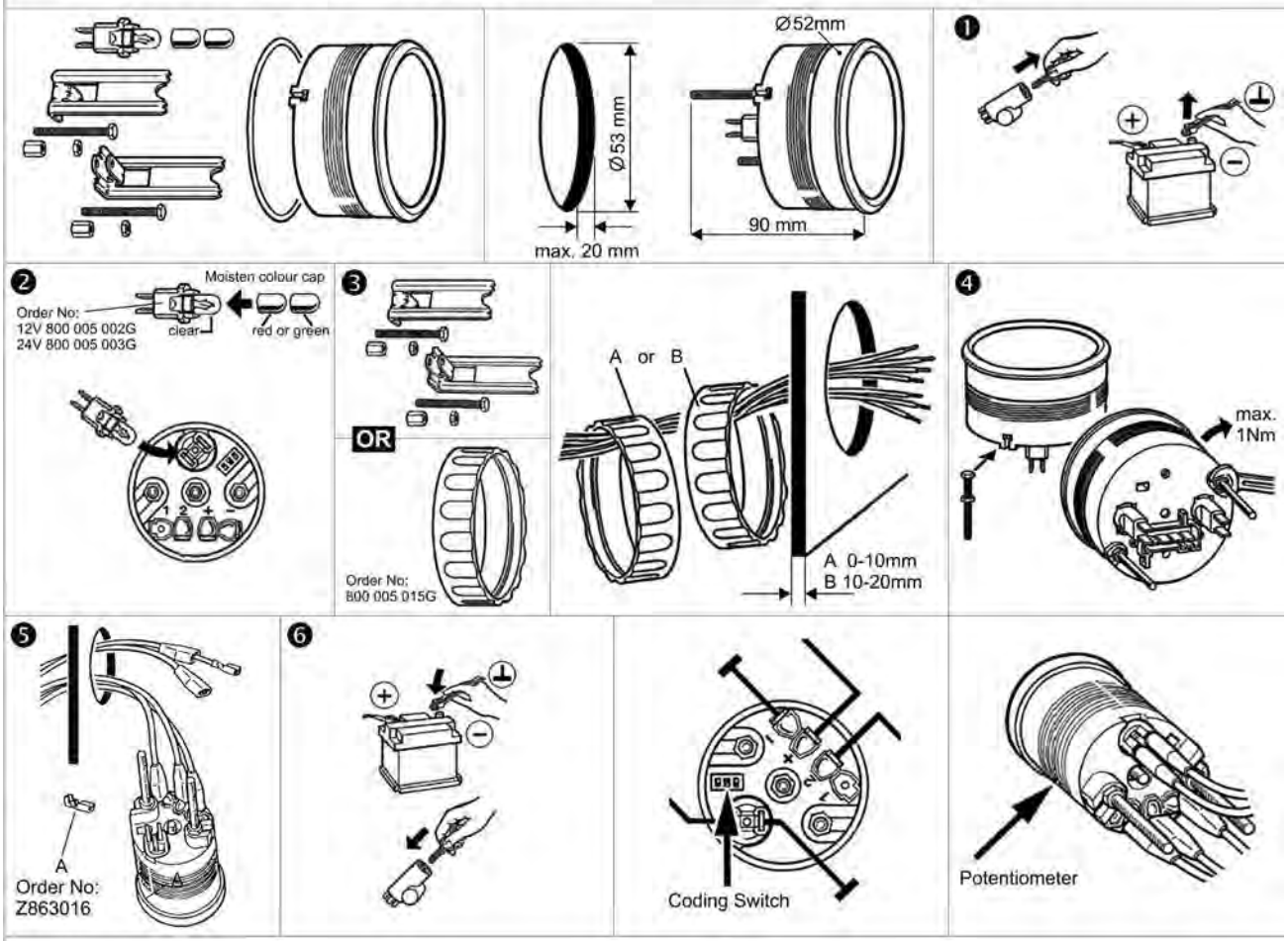


TACHOMETER - ELECTRONIC52MM

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)

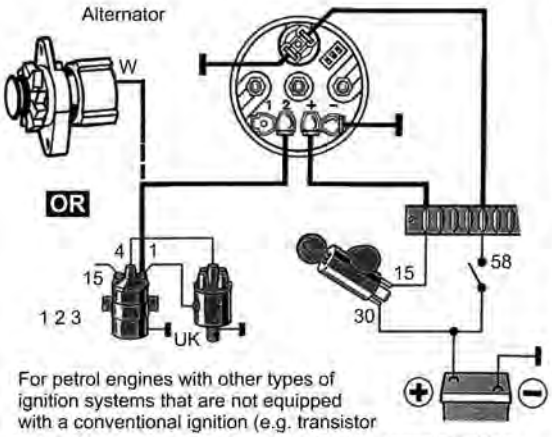


WARRANTY

The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

TACHOMETER - ELECTRONIC 52MM (CONT...)

SENSOR INSTALLATION



For petrol engines with other types of ignition systems that are not equipped with a conventional ignition (e.g. transistor coil ignition systems, electronic and fully electronic ignition systems), please ask for information on the tachometer connection from the manufacturer of the vehicle, engine or ignition system.

❼

Adjustment

Basic adjustment prior to installation

To calibrate the VDO tachometer, there are three options:
1. Select the number of cylinders (4, 6, 8 cylinders) for petrol engines, ignition coil Cl.1 (only one ignition coil!) using a coding switch.
2. Select the pulses per revolution for connection Cl. W (alternating current) of the alternator for diesel engines, using a coding switch. Please ask for information on the pulses per revolution from the vehicle manufacturer.
3. Make fine adjustment using reference data only for connection Cl.W (alternating current) of the alterntor for diesel engines, using a potentiometer.

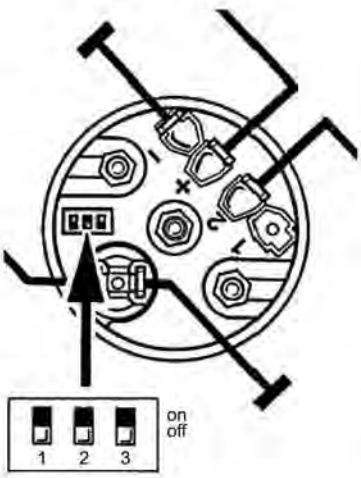
Caution: Readjustment of the potentiometer Cl.1 for petrol engines results in malfunction indications.

Note:
In its status for delivery, the unit is adjusted to Cl. 1,4 cylinders.

I

Select number of cylinders for petrol engines (4-stroke), using a coding switch.

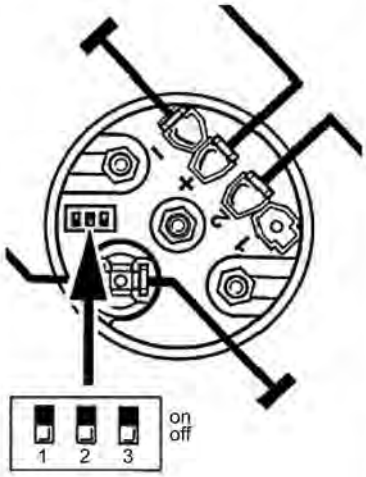
Petrol engine Cl.1 (one ignition coil)				
Switch			Cylinders	-stroke
1	2	3		
on	off	off	4	4
on	off	on	6	4
on	on	off	8	4
on	on	on	8	4



II

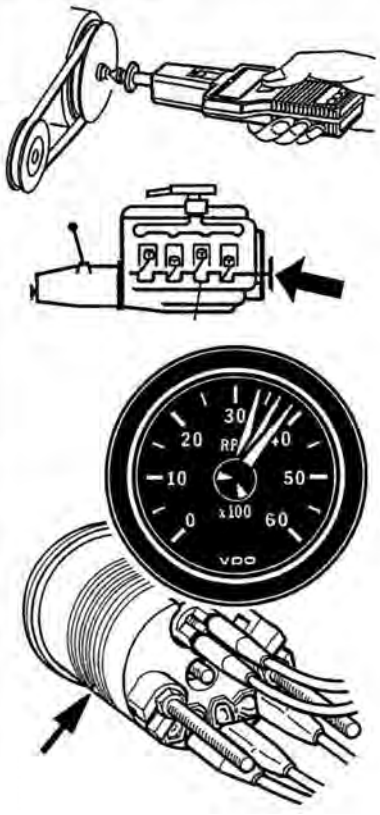
Select pulses per revolution, connection Cl.W (alternating current) for diesel engines, using a coding switch.

Diesel engine Cl. W				
Switch			RPM	
1	2	3	6000	8000
off	off	off	8-12	6-9
off	off	on	12-17	9-13
off	on	off	17-24	12-18
off	on	on	17-24	12-18
			pulses	



III

Fine adjustment only for connection Cl.W (alternating current) for diesel engines, using a potentiometer.
Adjust tachometer with a service tachometer. Fine adjustments can be performed only between 30% and 100% of the indicator range.

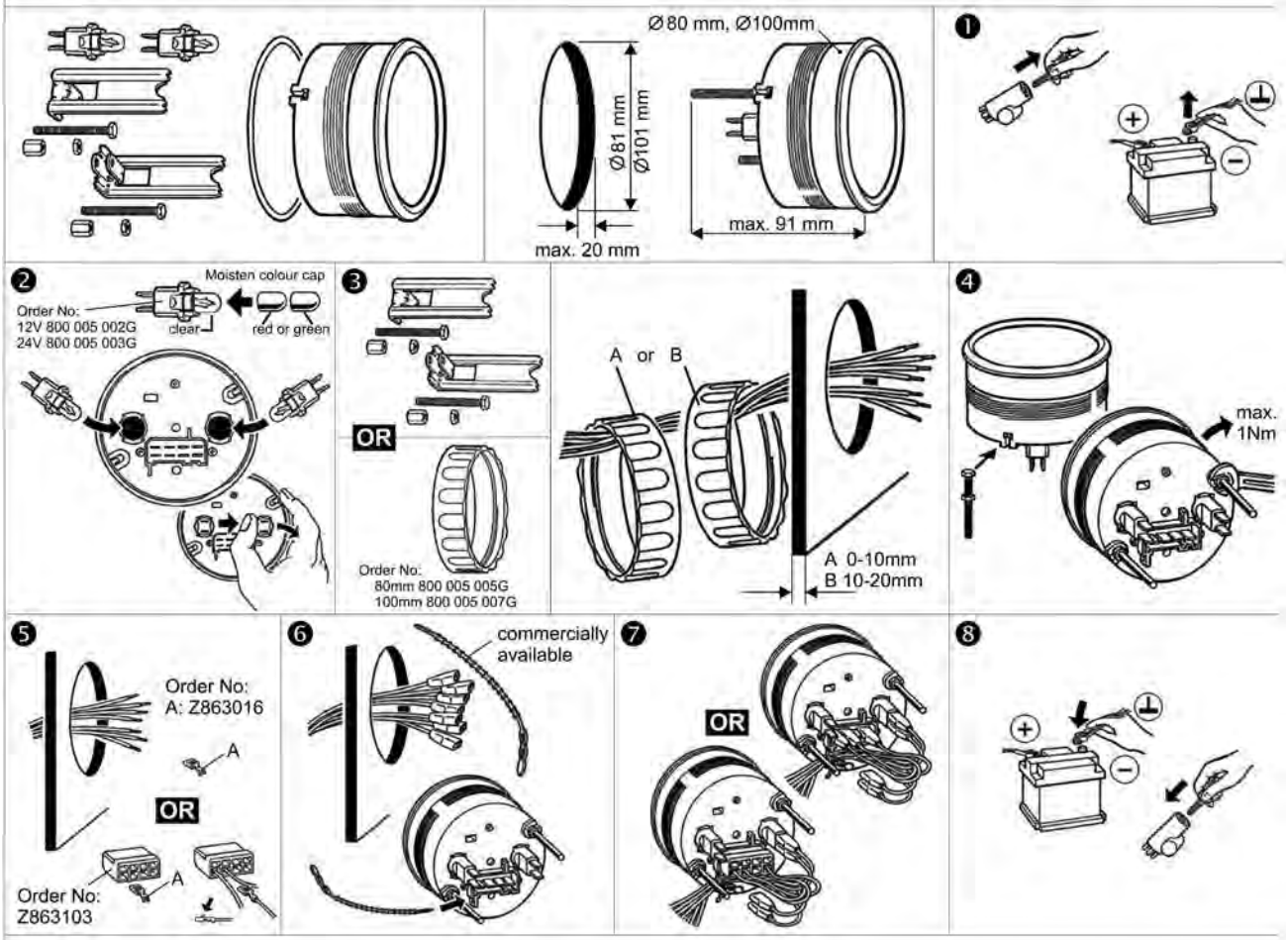


TACHOMETER - ELECTRONIC 80 -100MM

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)

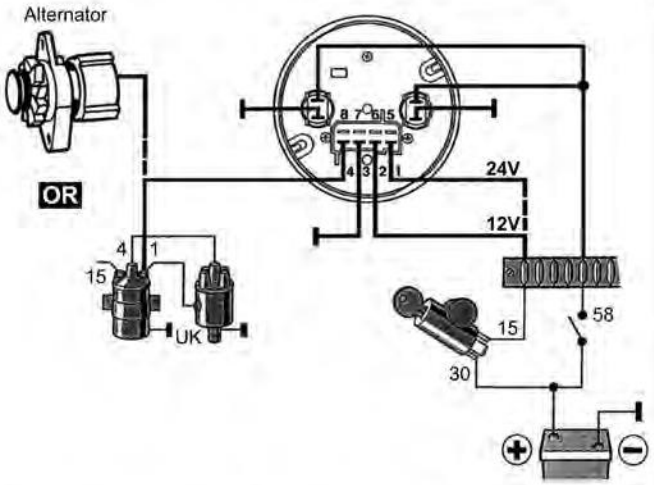


WARRANTY

The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

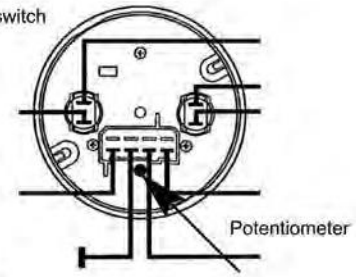
TACHOMETER - ELECTRONIC 80 - 100MM (CONT...)

SENSOR INSTALLATION



For petrol engines with other types of ignition systems that are not equipped with a conventional ignition coil (e.g. transistor coil ignition systems, electronic and fully electronic ignition systems), please ask for information on the tachometer connection from the manufacturer of the vehicle, engine or ignition system.

❾ Coding switch



Adjustment

Basic adjustment prior to installation

To calibrate the VDO tachometer, there are three options:
1. Select the number of cylinders (4, 6, 8 cylinders) for petrol engines, ignition coil Cl.1 (only one ignition coil!) using a coding switch.
2. Select the pulses per revolution for connection Cl. W (alternating current) of the alternator for diesel engines, using a coding switch. Please ask for information on the pulses per revolution from the vehicle manufacturer.
3. Make fine adjustment using reference data only for connection Cl.W (alternating current) of the alterntor for diesel engines, using a potentiometer.

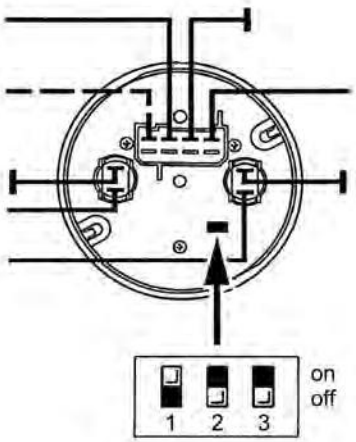
Caution: Readjustment of the potentiometer Cl.1 for petrol engines results in malfunction indications.

Note:
In its status for delivery, the unit is adjusted to Cl. 1,4 cylinders.

I

Select number of cylinders for petrol engines (4-stroke), using a coding switch.

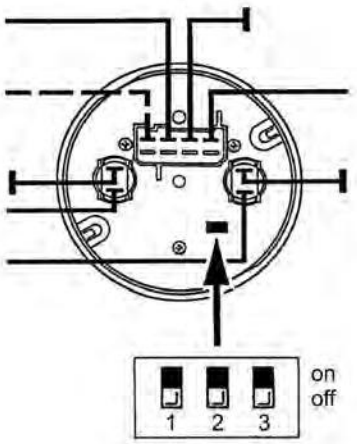
Petrol engine Cl.1 (one ignition coil)				
Switch			cyl	-stroke
1	2	3		
on	off	off	4	4
on	off	on	6	4
on	on	off	8	4
on	on	on	8	4



II

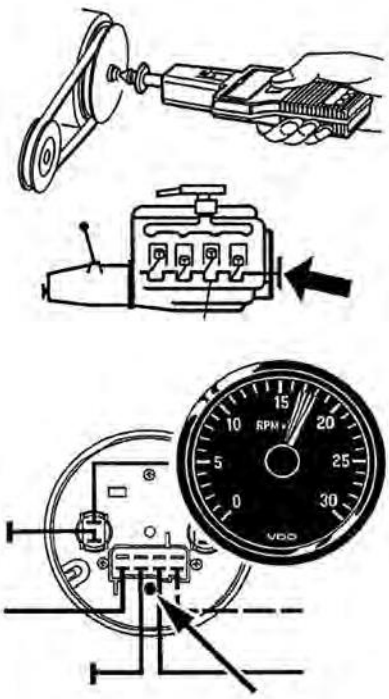
Select pulses per revolution, connection Cl.W (alternating current) for diesel engines, using a coding switch.

Diesel engine Cl. W							
Switch			RPM				
1	2	3	3000	4000	6000	7000	8000
off	off	off	8-12	6-9	8-12	7-10	6-9
off	off	on	12-17	9-13	12-17	10-15	9-13
off	on	off	18-25	13-20	17-24	14-21	12-18
off	on	on	18-25	13-20	17-24	14-21	12-18
			pulses/revolution				



III

Fine adjustment only for connection Cl.W (alternating current) for diesel engines, using a potentiometer.
Adjust tachometer with a service tachometer. Fine adjustments can be performed only between 30% and 100% of the indicator range.

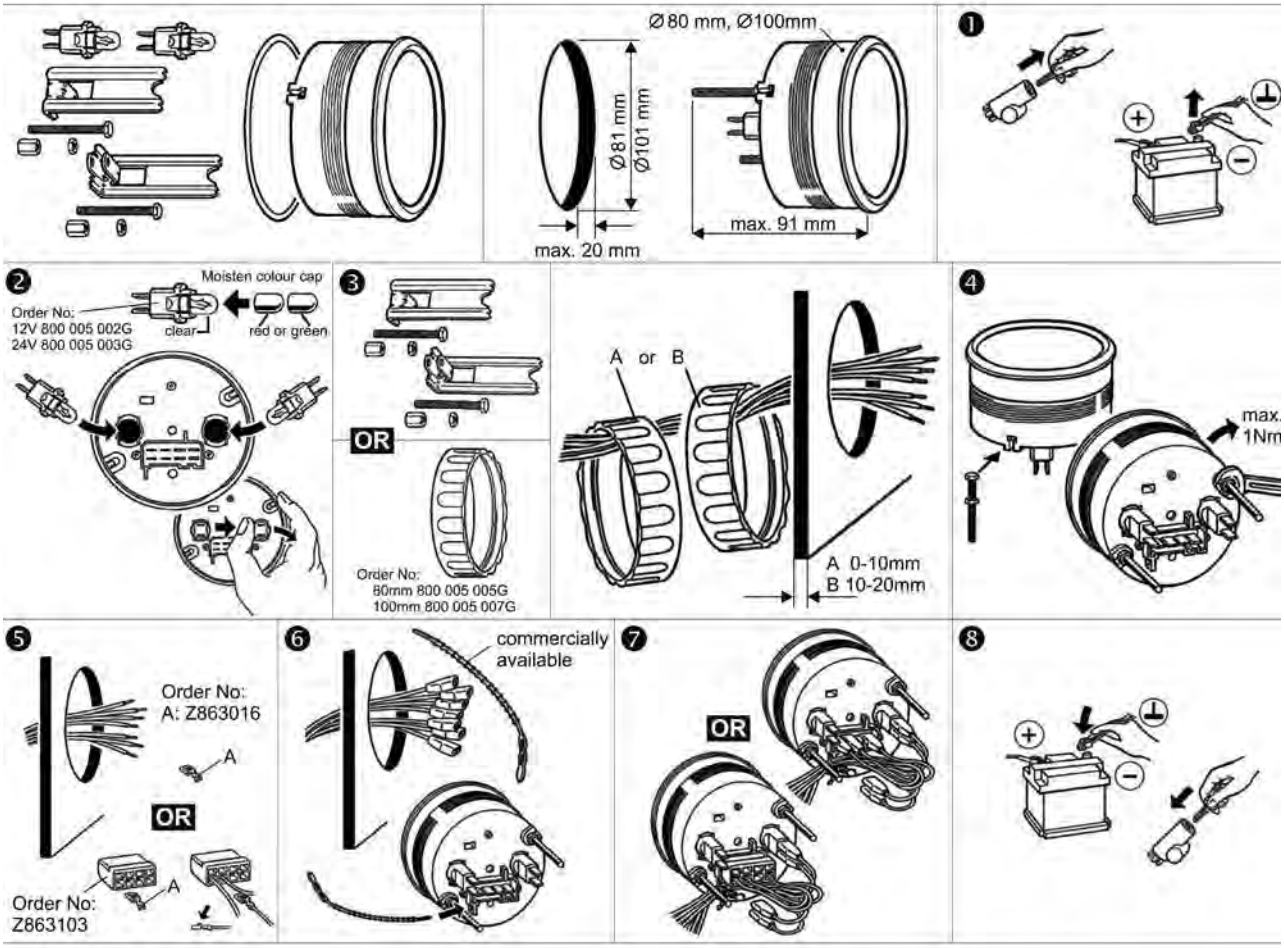


TACHOURMETER - ELECTRONIC 80 - 100MM

INSTALLATION INSTRUCTIONS

Safety Instructions

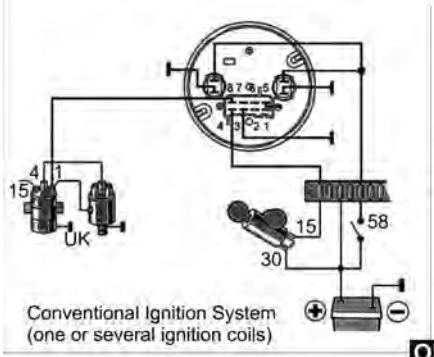
- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)



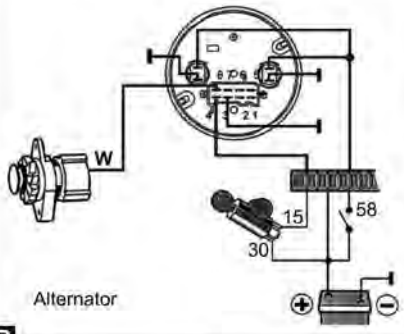
WARRANTY

The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

TACHOURMETER - ELECTRONIC 80 - 100MM (CONT...)

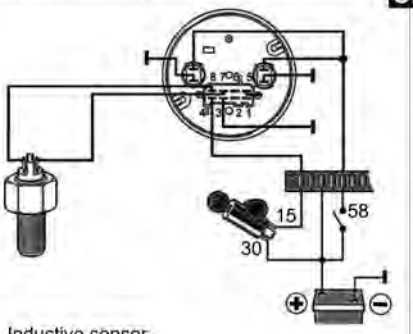


Conventional Ignition System
(one or several ignition coils)

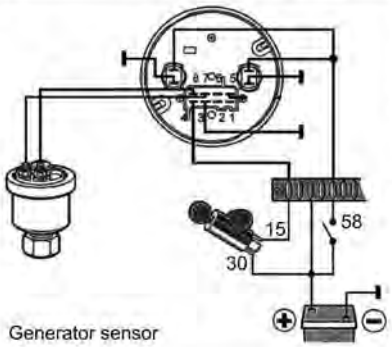


Alternator

OR



Inductive sensor



Generator sensor

9 Display of the operating hours

The operating hour counter indicates the accumulated operating hours up to a maximum of 99,999.9 hours.

Adjustment

To calibrate the VDO tachometer, there are three methods:

"SELECt": Select the number of cylinders for petrol engines (2-stroke & 4-stroke). Conventional ignition system TI.1 (only one ignition coil!). For other conventional ignition systems, (eg. transistor coil ignition systems, electronic and fully electronic systems), please ask for details on the tachometer connection from the vehicle manufacturer or ignition system manufacturer.

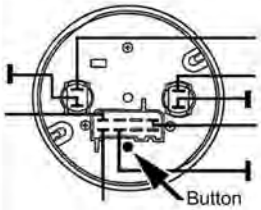
"PULSE": The pulse number per revolution is known: TI.1 (also several ignition coils), TI.W, inductive sensor, generator sensor.

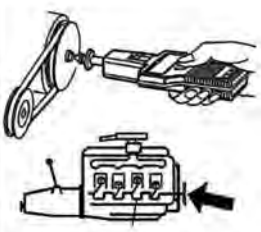
"AdJUSt" precise tuning using a reference.

Press and hold down the button on the rear side of the unit and switch on the operating voltage (ignition) at the same time. If you continue to hold down the button, the **"SELECt"**, **"PULSE"** and **"AdJUSt"** display will change egvery two seconds. To select one of these functions, release the button as soon as the corresponding function appears in the display and then wait approx. five seconds.

Adjustment

SELECt PULSE AdJUSt





"SELECt"

This function is used to adjust the number of cylinders and the stroke (2-stroke or 4-stroke). Hold down the button on the rear side of the unit and switch on the operating voltage.
As soon as SELECT appears in the display, release the button.

Press the button to make the following adjustments:

4-stroke 1; 2; 3; 4; 5; 6; 8; 12 cylinders
2-stroke 1; 2; 3; 4 cylinders

Example of the display: "4 - 8C" = 4-stroke 8 cylinders. Following the adjustment, the unit returns automatically to the normal function, when the button is no longer pressed (operating hour counter).

"PULSE"

$$\frac{\text{pulse}}{\text{revolution}} \quad \frac{\text{2 x number of cylinders}}{\text{stroke x ignition coil}} \rightarrow \text{(2-stroke or 4-stroke)}$$

Select the function and then release the button. After a few seconds, the individual digits will begin to flash in regular sequence. Press the button to change the flashing digits. This function can also be used to check the selected pulse number of revolution.
The unit returns automatically to the normal function when the button is no longer pressed (operating hour counter).

"AdJUSt"

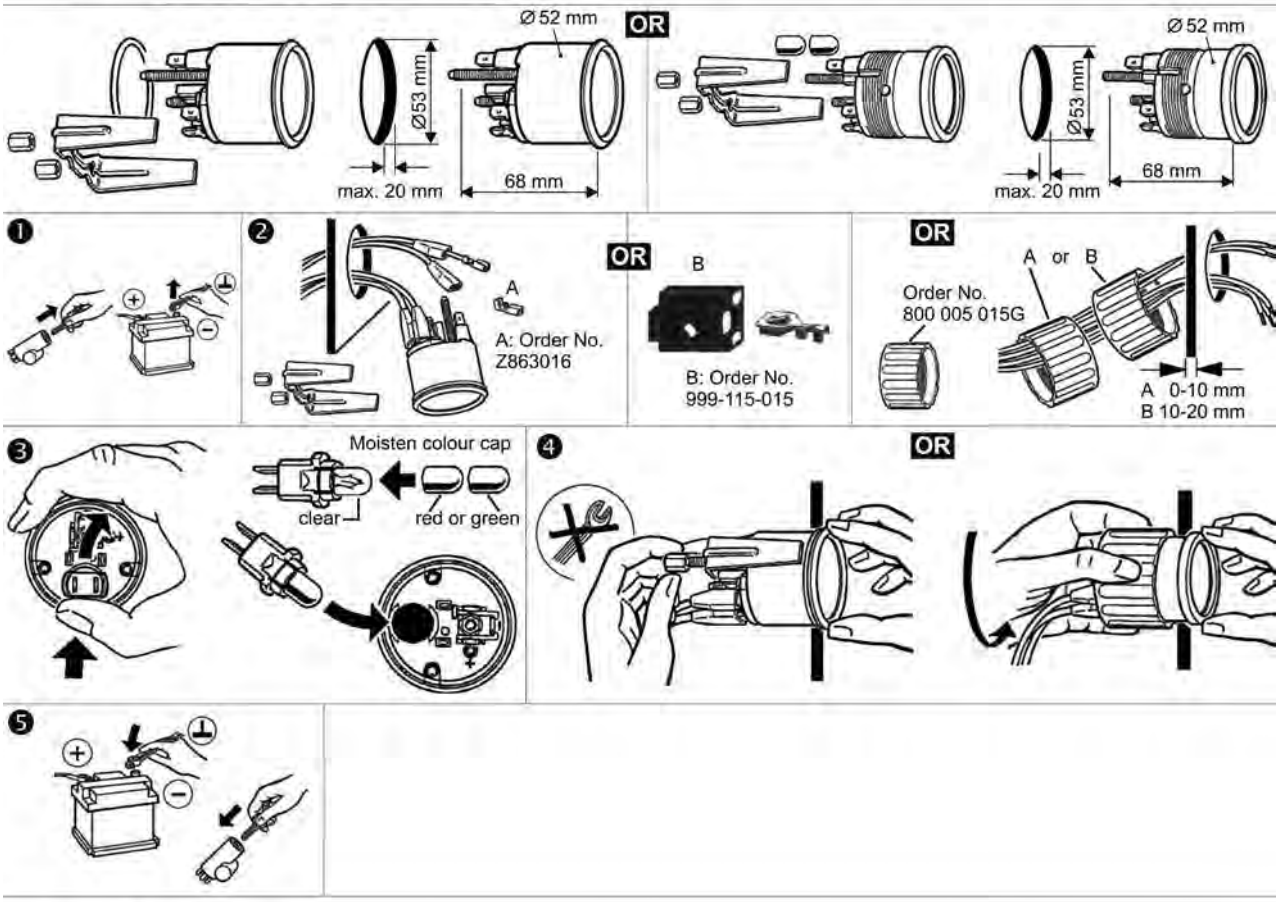
Perform this function with the aid of a sampling tachometer! The adjustment can be made only between 30% and 100% of the display range. The reading in the display changes from "UP to "dn" (UP and down). If you press and hold down the button, the travel of the indicator will increase. At first, the change is very slow and becomes faster the longer the button is held down. If the button is not pressed again following the adjustment, the unit will return to the normal function approx (operating hour counter).

TEMPERATURE GAUGE - OIL

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)



WARRANTY

The warranty is for 12 months from date of installation. Standard Control Instruments warranty conditions apply.

TEMPERATURE GAUGE - OIL

SENSOR INSTALLATION

Sensor Installation Location

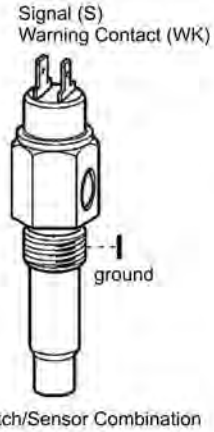
Install sensor in the place provided by the automobile manufacturer in the coolant circulation system (e.g. in place of the temperature warning switch) or in the coolant hose.

Safety Instructions

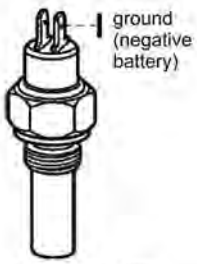
- ✓ Only install the sensor when the engine is cold.
- ✓ Replace any coolant lost during installation process, to the correct level and composition specified by the automobile manufacturer.
- ✓ Make sure that the correct amount of torque is applied (Nm max.) See table below.

Maximum Tightening Torque (Nm Max)

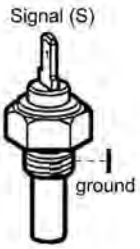
M10 x 1	10 Nm
M10 x 1,5	10 Nm
1/8 - 27 NPTF	10 Nm
M12 x 1,5	15 Nm
1/2 - 20 Gang	15 Nm
M14 x 1,25	20 Nm
M14 x 1,5	20 Nm
5/8 - 18 UNF - 3A	20 Nm
1/2 In.20 Whit. S	20 Nm
1/4 - 18 NPTF	20 Nm
M16 x 1,5	30 Nm
M18 x 1,5	30 Nm
M20 x 1,5	30 Nm
M22 x 1,5	30 Nm
M24 x 1,5	30 Nm
M26 x 1,5	30 Nm
1/2 - 14 NPTF	30 Nm
3/8 - 18 NPTF	30 Nm
R1/2	30 Nm
R3/8	30 Nm
3/8 - 18 Dryseal NPTF	30 Nm
3.4 - 16 UNF - 3A	30 Nm

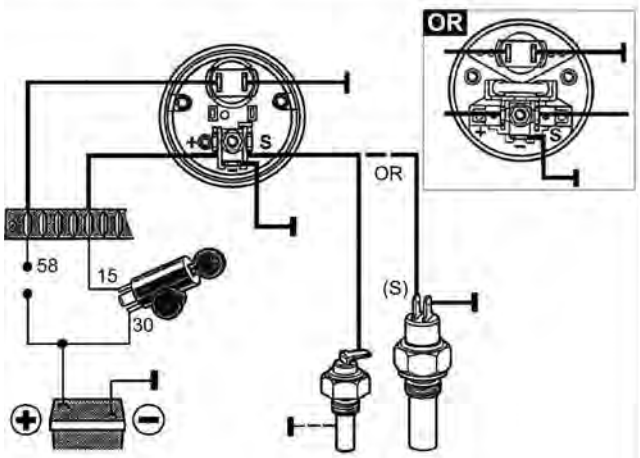


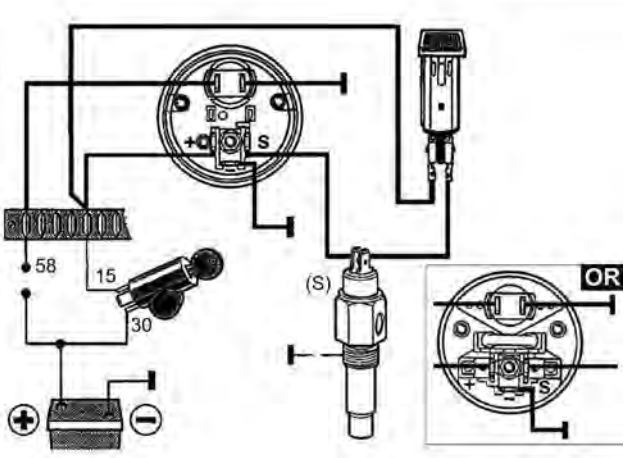
Temp Switch/Sensor Combination



Insulated ground return





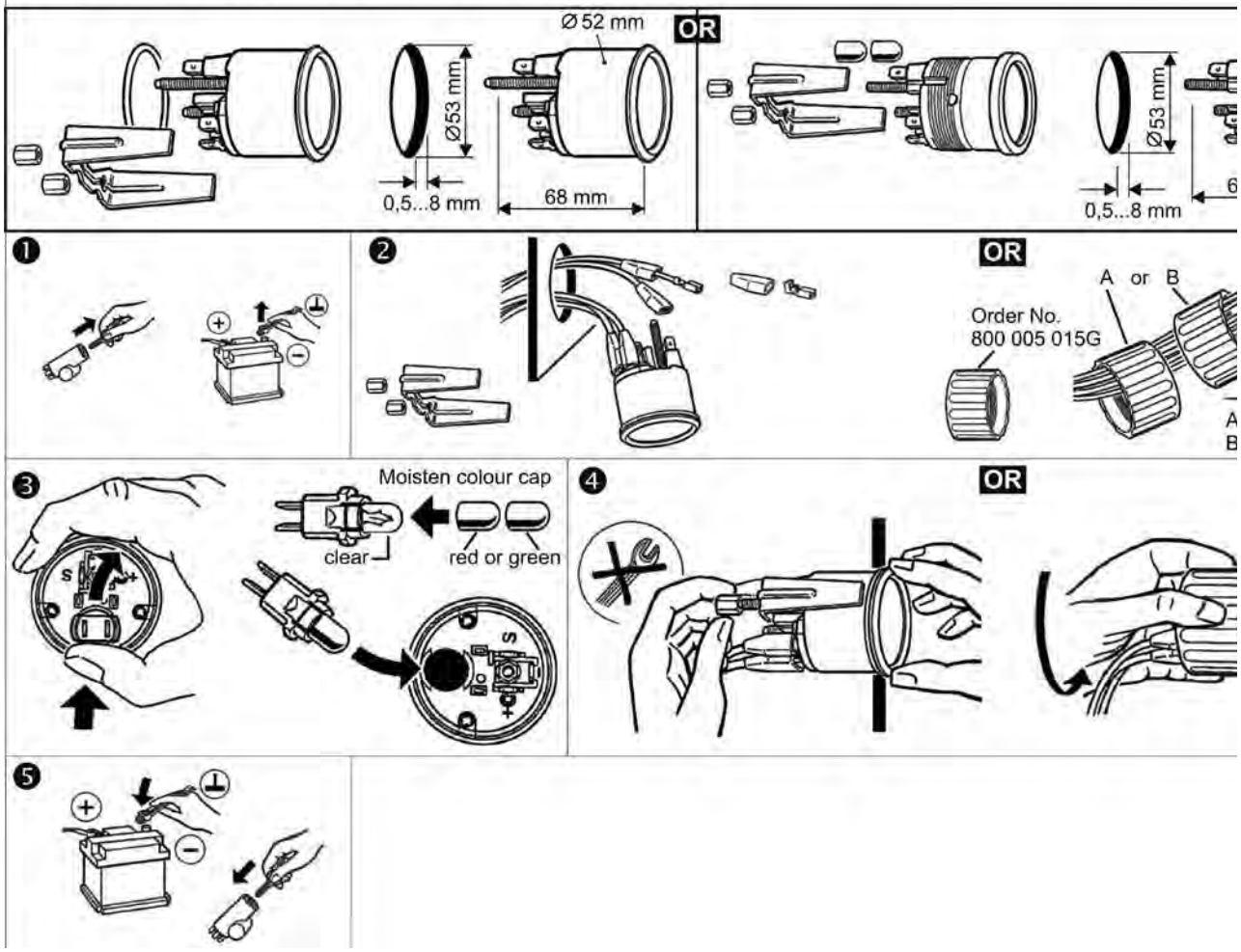


TEMPERATURE GAUGE - ENGINE COOLANT

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be progra again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruis burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation openi drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the instructions of the hand tool manufacturer.)



TEMPERATURE GAUGE - ENGINE COOLANT (CONT...)

SENSOR INSTALLATION

Sensor Installation Location

Install sensor in the place provided by the automobile manufacturer in the coolant circulation system (e.g. in place of the temperature warning switch) or in the coolant hose.

Safety Instructions

- ✓ Only install the sensor when the engine is cold.
- ✓ Replace any oil lost during installation process, to the correct level and composition specified by the automobile manufacturer.
- ✓ Make sure that the correct amount of torque is applied (Nm max.) See table below.

Maximum Tightening Torque (Nm Max)

M10 x 1	10 Nm
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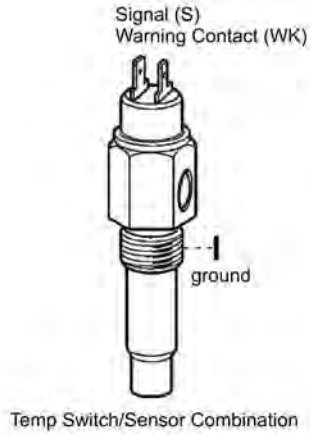
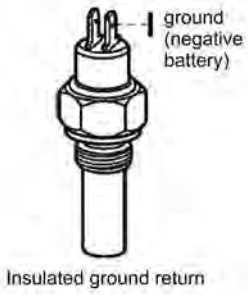
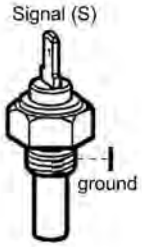
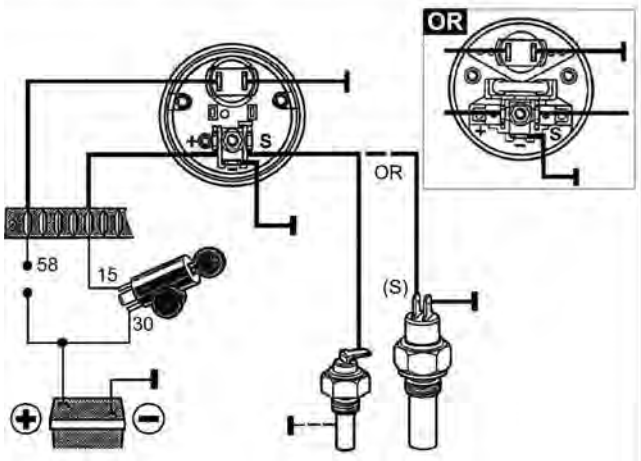
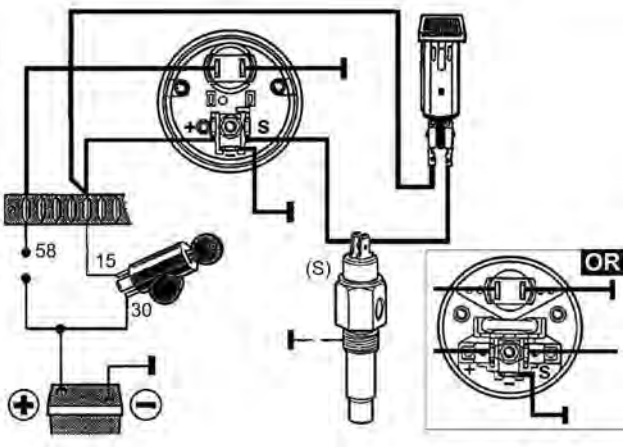
1/8 - 27 NPTF	10 Nm
M12 x 1,5	15 Nm
1/2 - 20 Gang	15 Nm
M14 x 1,25	20 Nm
M14 x 1,5	20 Nm
5/8 - 18 UNF - 3A	20 Nm
1/2 In.20 Whit. S	20 Nm
1/4 - 18 NPTF	20 Nm
M16 x 1,5	30 Nm
M18 x 1,5	30 Nm
M20 x 1,5	30 Nm
M22 x 1,5	30 Nm
M24 x 1,5	30 Nm
M26 x 1,5	30 Nm
1/2 - 14 NPTF	30 Nm
3/8 - 18 NPTF	30 Nm
R1/2	30 Nm
R3/8	30 Nm
3/8 - 18 Dryseal NPTF	30 Nm
3.4 - 16 UNF - 3A	30 Nm









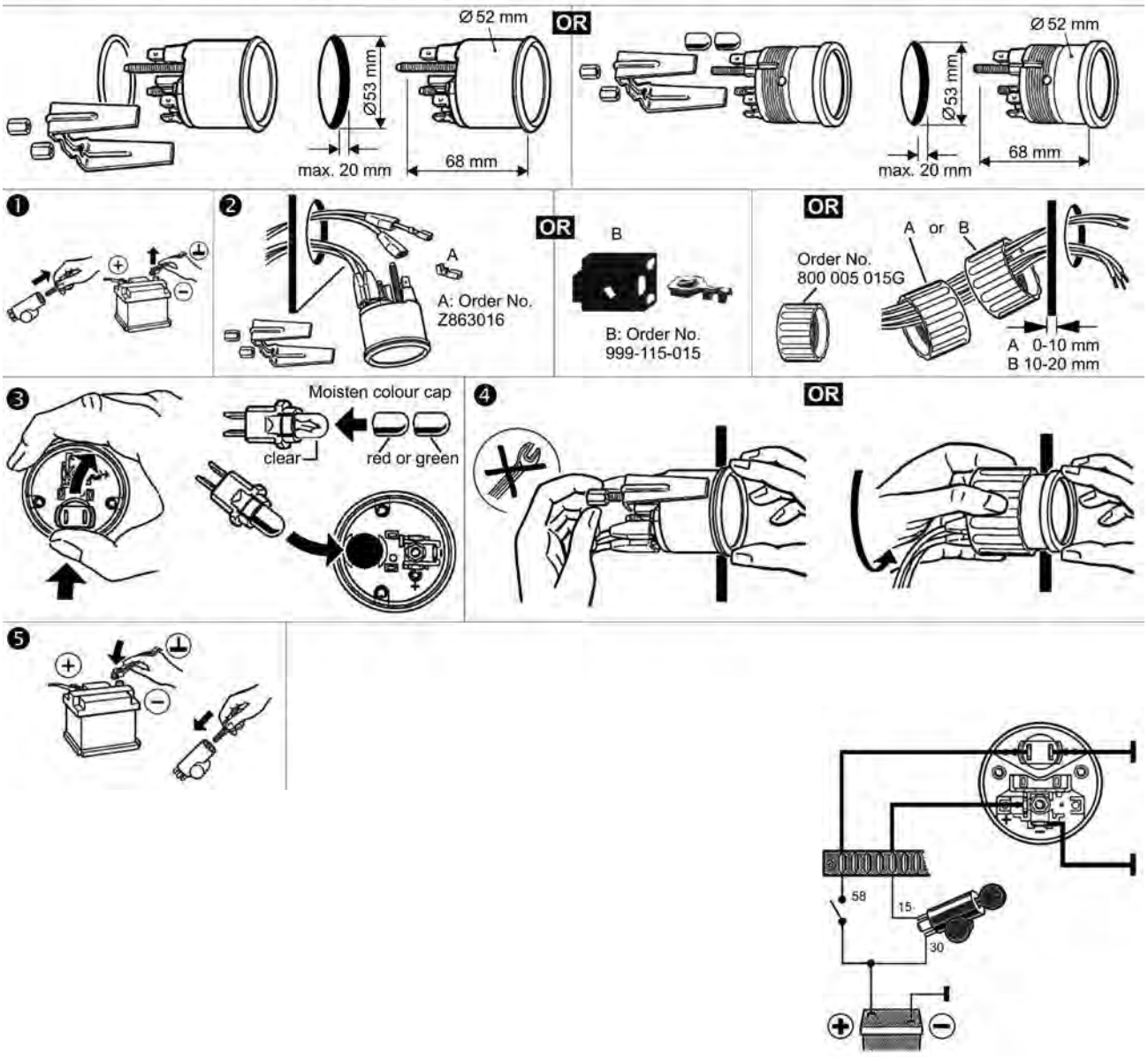


VOLTMETER

INSTALLATION INSTRUCTIONS

Safety Instructions

- ✓ Before installing, disconnect the negative pole of the battery to prevent a short circuit, which can cause cable fires, battery explosion and damage to electronic storage systems.
- ✓ Note that when the battery is disconnected, all electronic memory values will be lost and must be programmed again on connection.
- ✓ Be very cautious when working on a running engine as one can sustain serious injuries (including bruises and burns).
- ✓ Do not wear loose-fitting clothes!
- ✓ When installing the equipment unit, make sure there is sufficient clearance behind the installation opening. Use a drill to pre-drill the installation opening and complete it using a compass saw or piercing saw (follow the safety instructions of the hand tool manufacturer.)



PARTS LISTING –
VIEWLINE ALL-WEATHER

The future of analogue instrumentation.

Viewline is the new standardised instrumentation instrument platform for special-purpose vehicles and machines. With modular solutions in three housing variations, it supplies more functions, more flexible installation and design options as well as space-saving combi instruments – something unique in this sector. Viewline also offers a great deal of freedom to customise the cockpit and is the natural choice for an attractive price/performance ratio.

VDO's aim was to be forward-looking in the design concept of Viewline so that it would bring with it:

- A high degree of installation
- Freedom and flexibility

Trouble-free exchange or conversion to Viewline is therefore possible at any time. A safe and convenient solution for the instrument series has already been prepared for customers who would like to change to Viewline.

As an experienced and reliable partner of leading boat manufacturers, assistance during the planning stage is given. This allows seamless integration and optimum deployment of all the advantages which Viewline offers.

GAUGES

AMMETER – WITHOUT SHUNT

The Viewline ammeter provides an overview of the engines electrical system. The level of current being drawn and the supply current are clearly displayed. Voltage independent – suitable for 12V only. Illumination 12V included.

To be used with a 60mV shunt.

Part no.	Bezel option	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (A)	Input (mV)	Lens	Bezel
A2C59512325	Triangular	VLB	Ammeter	12+24	52	+60	60	SL	tb
A2C59512308	Triangular	VLB	Ammeter	12+24	52	+100	60	SL	tb
A2C59512328	n/a	VLB	Ammeter	12+24	52	+60	60	DL	rb
A2C59512329	n/a	VLB	Ammeter	12+24	52	+150	60	DL	rb

WHITE GAUGE OPTION

Part no.	Bezel option	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (A)	Input (mV)	Lens	Bezel
A2C59512310	n/a	VLW	Ammeter	12+24	52	30A	60	SL	tc
A2C59510404	n/a	VLW	Ammeter	12+24	52	60A	60	SL	tc
A2C59512312	n/a	VLW	Ammeter	12+24	52	100A	60	SL	tc
A3C59512330	n/a	VLW	Ammeter	12+24	52	60A	60	DL	rw
A2C59512331	n/a	VLW	Ammeter	12+24	52	150A	60	DL	rw

SHUNT RESISTORS

Part no.	Shunt Resistor	Description	Volt
A2C59514045	Ammeter Shunt Resistor	Shunts	100A/60mV
A2C59514047	Ammeter Shunt Resistor	Shunts	150A/60mV
A2C59514041	Ammeter Shunt Resistor	Shunts	30A/60mV
A2C59514043	Ammeter Shunt Resistor	Shunts	60A/60mV

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

CLOCK

- Electrical adjustment
- Changeable front bezel
- LED illumination
- Flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Lens	Bezel
A2C59513445	VLB	Clock	12	52	DL	rb
A2C59513446	VLB	Clock	24	52	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Lens	Bezel
A2C59513443	VLW	Clock	12	52	DL	rw
A2C59513444	VLW	Clock	24	52	DL	rw

DEPTH GAUGE

Gauge to be indicate depth, water temperature, time and voltage.

FEATURES

- LED illumination
- Integrated warning LED
- Backlit technology
- Changeable bezel
- Antifog and splash protection
- Panel and flush mount possibility
- Antifog and splash protection
- External swith for LCD operation
- NMEA 0183 data input, water depth, max. speed, water temperature, trip

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Depth (m)	Lens	Bezel
A2C59514247	VLB	Depth	12+24	85	30	DL	rb
A2C59514250	VLB	Depth	12+24	85	30	DL	rw

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

GAUGES (CONT...)

FRESHWATER (NO SENDER)

The Viewline water tank gauge indicates the level of freshwater. Capacity sensors can be fitted with a maximum depth of up to 1500mm.

- Anti-Fog double lens

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input (mA)	Lens	Bezel
A2C59510433	VLB	Fresh Water Level	12+24	52	20mA	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input (mA)	Lens	Bezel
A2C59514677	VLW	Fresh Water Level	12+24	52	20mA	DL	rw
A2C59514806	VLW	Fresh Water Level Kit with Sended	12+24	52			

SENDER

Part no.	Length (mm)	Signal
NO2-240-402	80 to 600	Cap 20mA

FUEL (NO SENDER)

The Viewline fuel gauge provides information about the fuel level in the tank and can be used with all tank sensors.

LEVER TYPE

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input	Range (ohm)	Lens	Bezel
A2C59514082	VLB	Fuel Level	12/24	52	LT	10 to 180	DL	rb

TUBULAR TYPE

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input	Range (ohm)	Lens	Bezel
A2C59514079	VLB	Fuel Level	12/24	52	DT	90 to 0,5	DL	rb

Refer to page 4 and 5 for senders

Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

FUEL (NO SENDER) (CONT...)

WHITE GAUGE OPTION

LEVER TYPE

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input	Range (ohm)	Lens	Bezel
A2C59514184	VLW	Fuel Level	12+24	52	LT	10 to 180	DL	rw
A2C59514185	VLW	Fuel Level	12+24	52	LT	10 to 180	DL	tc

TUBULAR TYPE

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input	Range (ohm)	Lens	Bezel
A2C59514182	VLW	Fuel Level	12+24	52	DT	90 to 0,5	DL	rw
A2C59514183	VLW	Fuel Level	12+24	52	DT	90 to 0,5	DL	tc
A2C59514185	VLW	Fuel Level	12+24	52	LT	10 to 180	DL	tc

HOURMETER

The Viewline hourmeter makes it easy to stick to a proper maintenance schedule. It is only activated when the engine is running so only genuine engine operating hours are counted.

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Lens	Bezel
A2C59512453	VLB	ECH Illumination	12+24	52	DL	rb
A2C59513080	VLB	ECH No Illumination	12+24	52	SL	tb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Lens	Bezel
A2C59512454	VLB	ECH W-Illumination	12+24	52	SL	tb

See page 131 for Bezel options.

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

GAUGES (CONT...)

OIL TEMPERATURE (NO SENDER)

- Integrated function LED
- Changeable front bezel
- LED illumination
- Flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Lens	Bezel
A2C59514160	VLB	Temperature Oil	12+24	52	150	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Lens	Bezel
A2C59514231	VLW	Temperature Oil	12+24	52	150	DL	rw
A2c59514233	VLW	Temperature Oil	12+24	52	150	DL	tc

SENDER

Part no.	Range (ºC)	Thread
323-801-009-001D	50 to 150	1/8 – 27NPT

OUTSIDE TEMPERATURE (NO SENDER)

- Integrated function LED
- Changeable front bezel
- LED illumination
- Flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Range (kOhm)	Lens	Bezel
A2C59512336	VLB	Temperature Outside	12+24	52	+50	2	DL	rb
A2C59514803	VLB	Temperature Outside Kit and Sender	12+24	52	+50	2	DL	rb

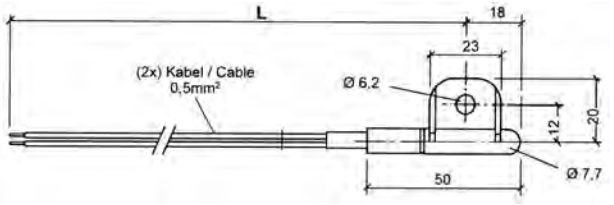
WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Range (kOhm)	Lens	Bezel
A2C59512338	VLW	Temperature Outside	12+24	52	-20 to +50	2	DL	rb
A2C59514804	VLW	Temperature Outside Kit and Sender	12+24	52	-20 to +50			

SENDER

Part no.	Range (ºC)	Cable Length
323-809-010-005C	-40 to +85	3000mm

Operational value 0ºC = 4082 Ω ± 26 Ω



Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

GAUGES (CONT...)

PITOT SPEEDO GAUGE

Gauge to be indicate Boat speed.

FEATURES

- LED illumination
- Changeable bezel
- Backlit technology
- Antifog and splash protection
- Panel and flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Input (kn)	Lens	Bezel
A2C31232400	VLB	Pitot Speedo	12	85	50	DL	C

PRESSURE (NO SENDER)

The Viewline pressure gauge detects fluctuations in engine and gearbox oil pressure and changes in turbocharger boost.

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Pressure	Lens	Bezel
A2C59514104	VLB	Pressure Brake	12/24	52	10bar	DL	tb
A2C59514123	VLB	Pressure Oil	12/24	52	5bar	DL	rb
A2C59514111	VLB	Pressure Oil	12/24	52	10bar	DL	rb
A2C59514136	VLB	Pressure Trans	12/24	52	25bar	DL	rb
A2C59514127	VLB	Pressure Oil	12/24	52	5kpa	DL	tb
A2C59514115	VLB	Pressure Oil	12/24	52	10kpa	DL	tb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Pressure	Lens	Bezel
A2C59514211	VLW	Pressure Oil	12+24	52	5bar	DL	rw
A2C59514199	VLW	Pressure Oil	12+24	52	10bar	DL	rw
A2C59514206	VLW	Pressure Oil	12+24	52	25bar	DL	rw
A2C59514212	VLW	Pressure Oil	12+24	52	5bar	DL	tc
A2C59514200	VLW	Pressure Oil	12+24	52	10bar	DL	tc
A2C59514195	VLW	Pressure Break	12+24	52	10bar	DL	tc

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

GAUGES (CONT...)

PYROMETER

The Viewline pyrometer indicates the exhaust temperature at the end of the exhaust pipe (up to 900ºC).

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)		Lens	Bezel
A2C59512332	VLB	Pyro	12+24	52	900	37mV	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)		Lens	Bezel
A2C59512333	VLW	Pyro	12+24	52	900	37mV	DL	rw
A2C59512315	VLW	Pyro	12+24	52	900	37mV	SL	tc
A2C59514802	VLW	Pyrometer Kit and Sender	12+24	52	900			

ACCESSORIES

Part no.	Description
N03-320-264	Sender
N03-320-266	Weld Boss
N03-320-268	Cable 4M

See page 131 for Bezel options.

Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

GAUGES (CONT...)

RUDDER ANGLE (NO SENDER)

The gauge shows the position of the rudder at all times and is available in 52 and 85mm diameters.

- Anti-Fog double lens.

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Lens	Bezel
A2C59514154	VLB	Rudder	12/24	52	40 STB	DL	rb
A2C59512410	VLB	Rudder	12+24	85	45 STB	DL	rb
A2C59514246	VLB	CIHaul	12+24	85	60 STB	DL	rb
A2C59514811	VLB	Rudder Angle Gauge and Sender Kit 52mm					
A2C59514812	VLB	Rudder Angle Gauge and Sender Kit 85mm					

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Lens	Bezel
A2C59514154	VLW	Rudder Angle	12+24	52	40 STB	DL	rw
A2C59512411	VLW	Rudder Angle	12+24	85	45 STB	DL	rw
A2C59514249	VLW	Rudder Angle Closed Haul	12+24	85	60 STB	DL	rw
A2C59514813	VLW	Rudder Kit and Sender	12+24	52	40 STB		
A2C59514814	VLW	Rudder	12+24	85	45 STB		

SENDER

Part no.	Bezel
440-102-001-001D	Single Station
440-102-002-001D	Dual Station

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

GAUGES (CONT...)

SPEEDOMETER (NO SENDER)

- Integrated warning LED
- Changeable front bezel
- LED illuminated
- Flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Speed (km/h)	Lens	Bezel
A2C59512367	VLB	Speedometer	12+24	85	60	SL	tb
A2C59512369	VLB	Speedometer	12+24	85	120	SL	tb
A2C59512370	VLB	Speedometer	12+24	85	200	SL	tb
A2C59512371	VLB	Speedometer	12+24	85	300	SL	tb
A2C59512376	VLB	Speedometer	12+24	85	140	SL	tb
A2C59512422	VLB	Speedometer	12+24	110	120	SL	tb
A2C59512423	VLB	Speedometer	12+24	110	200	SL	tb
A2C59512424	VLB	Speedometer	12+24	110	300	SL	tb
A2C59512428	VLB	Speedometer	12+24	110	140	SL	tb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Speed (km/h)	Lens	Bezel
A2C59512379	VLW	Speedometer	12+24	85	60	SL	tc
A2C59512380	VLW	Speedometer	12+24	85	80	SL	tc
A2C59512382	VLW	Speedometer	12+24	85	200	SL	tc
A2C59512389	VLW	Speedometer	12+24	85	140	SL	tc

Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

GAUGES (CONT...)

SUMLOG (NO SENDER) HALL/NMEA

The classic electronic route distance calculator with new technology for all pleasure boats.

- Display with various functions: water temperature, depth (NMEA, time, on-board voltage, trip, distance etc.)
- Anti-Fog double lens

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)		Lens	Bezel
A2C59510499	VLB	Sumlog	12+24	85	12KN	DL	rb
A2C59512405	VLB	Sumlog	12+24	85	50KN	DL	rb
A2C59514795	VLB	Sumlog Kit 85mm	12/24	85	12KN		
A2C59514797	VLB	Sumlog Kit 85mm	12/24	85	50KN		
A2C59514821	VLB	Sumlog Depth Kit	12/24	85	12KN		
A2C59514823	VLB	Sumlog Depth Kit	12/24	85	50KN		

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)		Lens	Bezel
A2C59514255	VLW	SumComp	12+24	85	12KN	DL	rw
A2C59514256	VLW	SumComp	12+24	85	30KN	DL	rw
A2C59514257	VLW	SumComp	12+24	85	50KN	DL	rw
A2C59514258	VLW	SumComp	12+24	85	60mph	DL	rw
A2C59514796	VLW	Sumlog Kit	12+24	85	12KN		
A2C59514798	VLW	Sumlog Kit	12+24	85	50KN		
A2C59514822	VLW	Sumlog Depth Kit	12+24	85	12KN		
A2C59514824	VLW	Sumlog Depth Kit	12+24	85	50KN		

SENDER (TRIDUCER)

Part no.	Description
X11-719-000-053	Transom Mount
X11-719-000-058	Hull Mount

See page 131 for Bezel options

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

GAUGES (CONT...)

SYNCHRONISER

On pleasure boats with double engine installations, the Viewline synchronizer is an indispensable aid in guaranteeing the correct synchronous running of both drive units.

- Anti-Fog double lens

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (RPM)	Lens	Bezel
A2C59512402	VLB	Synchroniser	12+24	85	+500	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (RPM)	Lens	Bezel
A2C59512403	VLW	Synchroniser	12+24	85	+500	DL	rw

TACHOMETER – NO LCD

- Changeable front bezel
- Flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (RPM)	Coil	Lens	Bezel
A2C59512355	VLB	Tachometer	12+24	85	6000	"W" Coil	DL	rb
A2C59512430	VLB	Tachometer	12+24	85	3000	"W" Coil	DL	rb
A2C59512431	VLB	Tachometer	12+24	85	4000	"W" Coil	DL	rb
A2C59512438	VLB	Tachometer	12+24	85	7000	"W" Coil	SL	tb
A2C59512444	VLB	Tachometer	12+24	110	3000	"W" Coil	SL	tb
A2C59512446	VLB	Tachometer	12+24	110	7000	"W" Coil	SL	tb
A2C59512447	VLB	Tachometer	12+24	110	10 000	"W" Coil	SL	tb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (RPM)	Lens	Bezel
A2C59512433	VLW	Tachometer	12+24	85	3000	DL	rw
A2C59512434	VLW	Tachometer	12+24	85	4000	DL	rw
A2C59512435	VLW	Tachometer	12+24	85	6000	DL	rw
A2C59512442	VLW	Tachometer	12+24	85	7000	SL	tc
A2C59512443	VLW	Tachometer	12+24	85	10 000	SL	tc

Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

GAUGES (CONT...)

TACHOURMETER – WITH LCD

Indicates engine revolution, engine hours, voltage and clock.

- Integrated warning LED
- Changeable front bezel
- LED illumination
- Flush mount possibility

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (RPM)	Coil	Lens	Bezel
A2C59512390	VLB	Tachometer	12+24	85	3000	"W", Coil, Ind, Hall	DL	rb
A2C59512391	VLB	Tachometer	12+24	85	4000	"W", Coil, Ind, Hall	DL	rb
A2C59510489	VLB	Tachometer	12+24	85	7000	"W", Coil, Ind, Hall	DL	rb
A2C59512357	VLB	Tachometer	12+24	85	8000	"W", Coil, Ind, Hall	SL	tb
A2C59512413	VLB	Tachometer	12+24	110	3000	"W", Coil, Ind, Hall	SL	tb
A2C59512414	VLB	Tachometer	12+24	110	4000	"W", Coil, Ind, Hall	SL	tb
A2C59512418	VLB	Tachometer	12+24	110	8000	"W", Coil, Ind, Hall	SL	tb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (RPM)	Coil	Lens	Bezel
A2C59512396	VLW	Tachometer	12+24	85	3000	"W", Coil, Ind, Hall	DL	rw
A2C59512397	VLW	Tachometer	12+24	85	4000	"W", Coil, Ind, Hall	DL	rw
A2C59512399	VLW	Tachometer	12+24	85	6000	"W", Coil, Ind, Hall	DL	rw
A2C59512401	VLW	Tachometer	12+24	85	8000	"W", Coil, Ind, Hall	DL	rw
A2C59512362	VLW	Tachometer	12+24	85	6000	"W", Coil, Ind, Hall	SL	tc

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

GAUGES (CONT...)

TEMPERATURE – AIR COOLED (NO SENDER)

The Viewline temperature gauge displays any sudden rise in coolant temperature, helping to prevent serious damage and the associated expenses.

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Lens	Bezel
A2C59514156	VLB	Temperature	12+24	52	200	DL	tb

SENDER

Part no.	Range (ºC)	Thread	Type
323-801-003-001D	60 to 200	M10x1.5	Button
323-801-028-001C	60 to 200	M14x1.5	Screw

TURBO BOOST

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (Bar)	Lens	Bezel
A2C59514152	VLB	Press Turbo	12/24	52	2	DL	tb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (Bar)	Lens	Bezel
A2C59510660	VLW	Press Turbo	12	52	2	SL	tc

SENDER

Part no.	Range (kPa)	Thread	Type
360-081-032-025C	200	1/8x27NPTF	2 blade

Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

GAUGES (CONT...)

VOLTAGE

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (V)	Lens	Bezel
A2C59512545	VLB	Volt	12	52	16	DL	rb
A2C59512458	VLB	Volt	24	52	32	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (V)	Lens	Bezel
A2C59512546	VLW	Volt	12	52	16	DL	rw
A2C59512459	VLW	Volt	24	52	32	DL	rw

WASTEWATER (NO SENDER)

The Viewline water tank gauge indicates the level of wastewater. Capacity sensors can be fitted with a maximum depth of up to 1500mm.

- Anti-Fog double lens.

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range	Lens	Bezel
A2C59512342	VLB	Level Waste Water	12+24	52	20mA	DL	rb
A2C59514807	VLB	Level Waste Water Kit	12+24	52	600mm		

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range	Lens	Bezel
A2C59510436	VLW	Level Waste Water	12+24	52	20mA	DL	rw
A2C59514808	VLW	Level Waste Water Kit, Gauge and Sender	12+24	52	600mm		

SENDER

Part no.	Length (mm)	Signal
N02-240-902	80 to 600	Cap 20mA
N02-200-904	600 to 1200	Cap 20mA
NO2-240-906	1200 to 1500	Cap 20mA

See page 131 for Bezel options

Abbreviations:								
	VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
	VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

WATER TEMPERATURE (NO SENDER)

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range (ºC)	Lens	Bezel
A2C59514170	VLB	Temperature Water	12+24	52	120	DL	rb

WHITE GAUGE OPTION

Part no.	Dial Colour	Description	Voltage (V)	Diameter (mm)	Range	Lens	Bezel
A2C59514237	VLW	Temperature Water	12+24	52	120	DL	rb
A2C59514239	VLW	Temperature Water	12+24	52	120	DL	tc

Abbreviations:							
VLB	Viewline Black	**SL**	Single Lens	**tb**	Triangular Black	**tc**	Triangular Crome
VLW	Viewline White	**DL**	Double Lens	**rw**	Round White		

CLASSIC MARINE NAVIGATION INSTRUMENTS

Key navigation gauges are currently under development as extension of our Viewline gauge range.

THE NEW NAVIGATION RANGE WILL CONSIST OF:

- a Wind Speed and Wind Direction Gauge,
- a Close Hauled Wind Gauge,
- an Analogue Water Depth Indicator,
- a Sumlog with Integrated Compass,
- a Pitot Speedometer,
- and a Mechanical Water Pressure Indicator for Outboard Engines.

The styling will match the current Viewline engine monitoring gauges, and provides the same possible design variations (bezels and dials).

VIEWLINE GAUGES FOR SMALL SERIES APPLICATIONS

(DIAMETER: 52,85 AND 110MM)

Individual Viewline Design.

Now, we offer a small series VDO Viewline solution (min.: order quantity of 50 pieces), that can provide an individual design according to customer specifications.

THE FOLLOWING VISUAL PARTS CAN BE CUSTOMIZED:

1 Background colour of the dial (definition in RAL or Pantone Colour code).
2 Adding a customer logo in predetermined areas (up to three different colours possible).
3 Pointer colour (red or white).
4 Colour lields in scale (up to three areas in different colours, not illuminated).
5 Red transmitted light areas in the scale (up to three areas, Pantone 192C).
6 Bezel shape and colour (nine different types available).
7 Adjusting threshold value of the tell tale. For gauges without LCD-Display: Viewline configuration software is available for programming the threshold value.

Abbreviations:	VLB	Viewline Black	SL	Single Lens	tb	Triangular Black	tc	Triangular Crome
	VLW	Viewline White	DL	Double Lens	rw	Round White		

VIEWLINE INSTALLATION 52MM

Safety information

- The product was developed, manufactured and inspected according to the basic safety requirements of EC Guidelines and state-of-the-art technology.
- The instrument is designed for use in grounded vehicles and machines as well as in pleasure boats, including non-classified commercial shipping.
- Use our product only as intended. Use of the product for reasons other than its intended use may lead to personal injury, property damage or environmental damage. Before installation, check the vehicle documentation for vehicle type and any possible special features!
- Use the assembly plan to learn the location of the fuel/hydraulic/compressed air and electrical lines!
- Note possible modifications to the vehicle, which must be considered during installation!
- To prevent personal injury, property damage or environmental damage, basic knowledge of motor vehicle/shipbuilding electronics and mechanics is required.
- Make sure that the engine cannot start unintentionally during installation!
- Modifications or manipulations to VDO products can affect safety. Consequently, you may not modify or manipulate the product!
- When removing/installing seats, covers, etc., ensure that lines are not damaged and plug-in connections are not loosened!
- Note all data from other installed instruments with volatile electronic memories.

Safety during installation:

- During installation, ensure that the product's components do not affect or limit vehicle functions. Avoid damaging these components!
- Only install undamaged parts in a vehicle!
- During installation, ensure that the product does not impair the field of vision and that it cannot impact the driver's or passenger's head!
- A specialized technician should install the product. If you install the product yourself, wear appropriate work clothing. Do not wear loose clothing, as it may get caught in moving parts. Protect long hair with a hair net.
- When working on the on-board electronics, do not wear metallic or conductive jewelry such as necklaces, bracelets, rings, etc.
- If work on a running engine is required, exercise extreme caution. Wear only appropriate work clothing as you are at risk of personal injury, resulting from being crushed or burned.
- Before beginning, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.
- If working on gasoline boat motors, let the motor compartment fan run before beginning work.
- Pay attention to how lines and cable harnesses are laid so that you do not drill or saw through them!
- Do not install the product in the mechanical and electrical airbag area!
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- When working underneath the vehicle, secure it according to the specifications from the vehicle manufacturer.
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary, using taper milling tools, saber saws, keyhole saws or files. Debur edges. Follow the safety instructions of the tool manufacturer.
- Use only insulated tools, if work is necessary on live parts.
- Use only the multimeter or diode test lamps provided, to measure voltages and currents in the vehicle/machine or boat. Use of conventional test lamps can cause damage to control units or other electronic systems.

No smoking! No open fire or lights!

- The electrical indicator outputs and cables connected to them must be protected from direct contact and damage. The cables in use must have sufficient insulation and electric strength and the contact points must be safe from touch.
- Use appropriate measures to also protect the electrically conductive parts on the connected consumer from direct contact. Laying metallic, uninsulated cables and contacts is prohibited.

Safety after installation:

- Connect the ground cable tightly to the negative terminal of the battery.
- Reenter/reprogram the volatile electronic memory values.
- Check all functions.
- Use only clean water to clean the components. Note the Ingress Protection (IP) ratings (IEC 60529).

Electrical connection:

- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cables, use the provided cable ducts and harnesses; however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Use only a soft soldering process or commercially available crimp connector to solder new cable connections!
- Make crimp connections with cable crimping pliers only. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and be sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

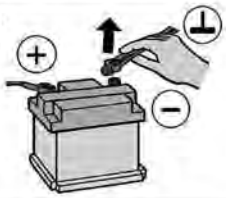
VIEWLINE INSTALLATION 52MM (CONT...)

Procedures for installing VDO Viewline instruments

1

Before beginning, turn off the ignition and remove the ignition key. If necessary, remove the main circuit switch.

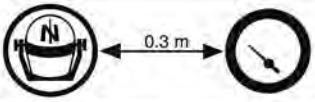
2



Disconnect the negative terminal on the battery. Make sure the battery cannot unintentionally restart.

- Before beginning, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

3



If installing the instrument near a magnetic compass, note the magnetic safe distance to the compass.

4

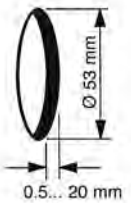
The following rings may be installed as alternatives to the supplied front ring:

Front ring, flat; black	A2C53186040
Front ring, flat; white	A2C53186022
Front ring, flat; chrome	A2C53186023
Front ring, triangular; black	A2C53186024
Front ring, triangular; white	A2C53186025
Front ring, triangular; chrome	A2C53186026
Front ring, round; black	A2C53186027
Front ring, round; white	A2C53186028
Front ring, round; chrome	A2C53186029

5

Place the new front ring on the instrument and press it on until it is flush with the instrument glass.

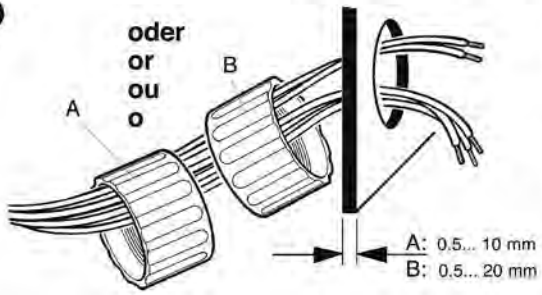
6



Conventional assembly. (Instrument is put into the drill hole from the front).
The panel width may be within a range of 0.5 to 20 mm.
The drill hole must have a diameter of 53 mm.

- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary, using taper milling tools, saber saws, keyhole saws or files. Debur edges. Follow the safety instructions of the tool manufacturer.

7



For 52 mm instruments, the fastening nut can be mounted at position A or B. This allows you to realize various clamping heights.

Version A
Clamping height 0.5 – 10 mm

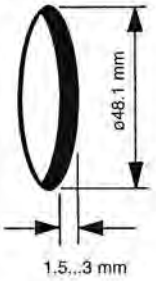
Version B
Clamping height 0.5 – 20 mm

VIEWLINE INSTALLATION 52MM (CONT...)

8

If the instrument is mounted flush (i.e., from the back so that the instrument glass and the panel form one plane), the front ring must be removed. Press the instrument glass with both thumbs, while at the same time pressing the front ring forward from the instrument with both index fingers. Note the use of a tool in the adjacent figure.

9

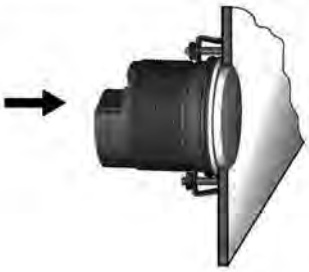


Flush assembly

The recommended panel thickness is 1.5 to 3 mm. The drill hole must have a diameter of 48.1 mm. Ensure that the installation location is level and has no sharp edges.

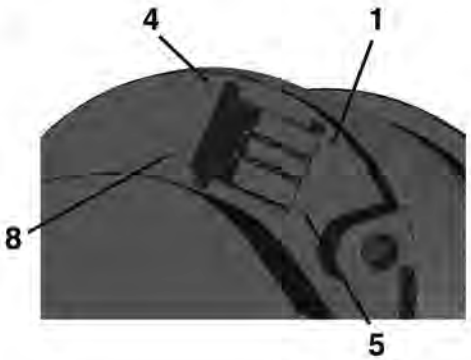
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary, using taper milling tools, saber saws, keyhole saws or files. Debur edges. Follow the safety instructions of the tool manufacturer.

10



Place the flush mount seal A2C53215640 on the instrument glass.
Put the instrument into the drill hole from the back. Adjust the instrument so that the gauge is level and fasten it to the stud bolts on the rear side of the panel, using the flush mount fixing bracket A2C59510864.

11



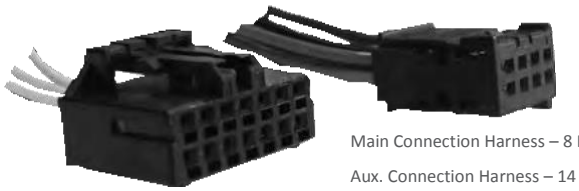
Depending on the configuration, insert the cable into the 8-pin contact enclosure according to the following pin assignment. The contacts must audibly lock into place.

Pin 1 - T. 15 - ignition plus 12 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - unassigned
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - warning LED ground
Pin 8 - warning LED plus

Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

VIEWLINE INSTALLATION 52MM (CONT...)

⑫



Main Connection Harness – 8 Pin A2C – 8 Way

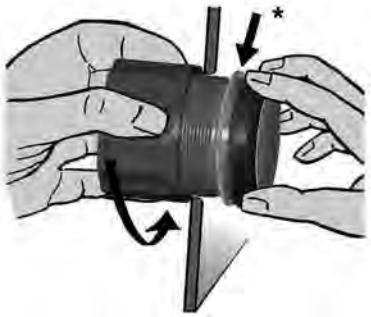
Aux. Connection Harness – 14 Pin A2C – 14 Way

Electrical connection:

- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cables, use the provided cable ducts and harnesses; however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Use only a soft soldering process or commercially available crimp connector to solder new cable connections!
- Make crimp connections with cable crimping pliers only. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

VIEWLINE INSTALLATION 52MM (CONT...)

⑭



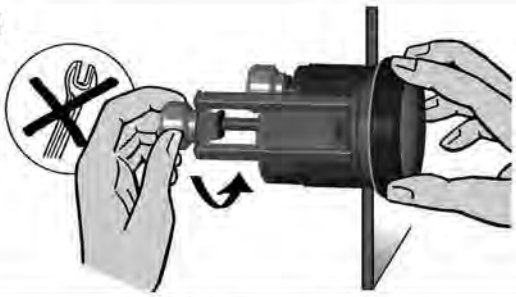
Align the instrument and hand-tighten the fastening nut. Ensure that the nut is not tightened with a torque greater than 400 Ncm.

* Make sure the seal lays flat between the panel and the front ring.

⑮

If you would like to omit the fastening nut, you may use the part set A2C59510854 as an alternative. This is recommended if the installation location is subject to vibratory loads.
Screw the stud bolts into the provided drill holes in the enclosure. Max. stud bolt torque is 1.5 Nm.

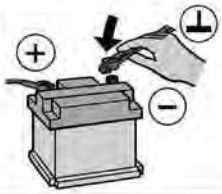
⑯



Place the bracket on the stud bolt and hand-tighten the knurled nut.

* Make sure the seal lays flat between the panel and the front ring (see Fig. 14).

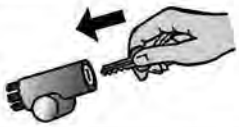
⑰



Close the battery after inspecting the connection.

⚠ • Please note that when you disconnect the battery, all volatile electronic memory lose their input values and must be reprogrammed.

⑱



If necessary, replace the main circuit switch. Turn on the ignition and conduct a functional test. Reprogram any other instruments that may have lost their saved settings.

⑲ Important: Clean the instrument glass and front frame with water only. Do not use chemical agents.

⑳ **Accessories / Spare parts**

Bush contacts 0.25 – 0.5 mm²	A2C59510846
Bush housing, 8-pin	A2C59510847
Hand pliers	Tyco No. 539635-1
Tool for hand pliers	Tyco No. 539682-2.
Single contacts 0.14 – 0.22 mm²	Tyco No. 1355718-1
Single contacts 0.5 – 0.75 mm²	Tyco No. 963729-1
Strip 0.14 – 0.22 mm²	Tyco No. 1355717-1
Strip 0.25 – 0.5 mm²	Tyco No. 928999-1
Strip 0.5 – 0.75 mm²	Tyco No. 963715-1
Bracket assembly mounting set	A2C59510854
Flush mount fixing bracket	A2C59510864
Flush mount seal	A2C53215640
Fastening nut	A2C53007398
Front ring, flat; black	A2C53186040
Front ring, flat; white	A2C53186022
Front ring, flat; chrome	A2C53186023
Front ring, triangular; black	A2C53186024
Front ring, triangular; white	A2C53186025
Front ring, triangular; chrome	A2C53186026
Front ring, round; black	A2C53186027
Front ring, round; white	A2C53186028
Front ring, round; chrome	A2C53186029
Series resistor 24V (connector not included)	A2C59510221
Series resistor 24V (connector not included)	A2C59510853
Warning point control	A2C59510886
Protective connector cap, 8-pin	A2C53324664

VIEWLINE INSTALLATION 52MM (CONT...)

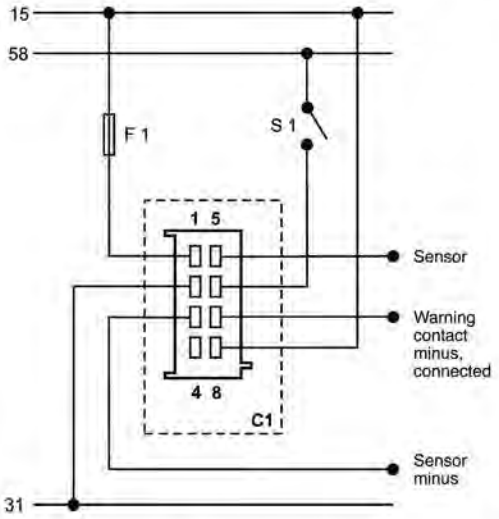
TEMPERATURE, PRESSURE, TRIM, FUEL, FRESH WATER GAUGES FOR LEVEL-TYPE SENSOR

Designations in the wiring diagram:

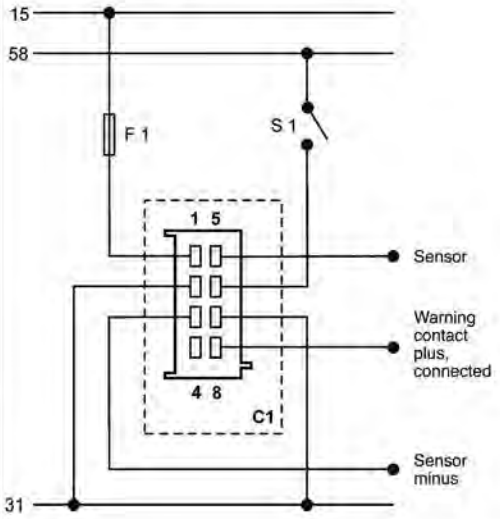
15 - terminal 15 - connected (ignition) plus 12 V
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
C2 - series resistor 24
You must comply with the wiring diagram.

Connection 12 V

Variant 1: Warning contact minus, connected

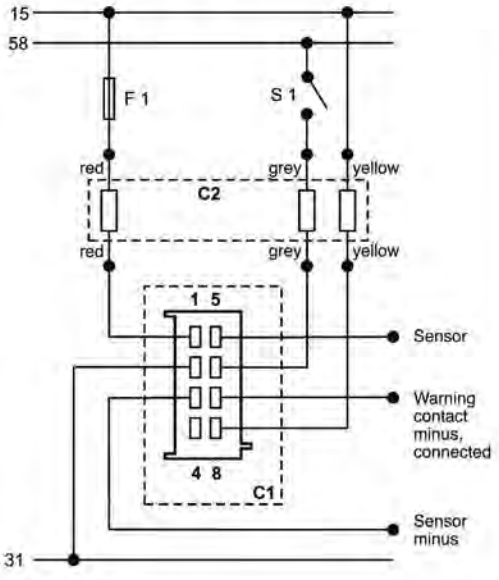


Variant 2: Warning contact plus, connected

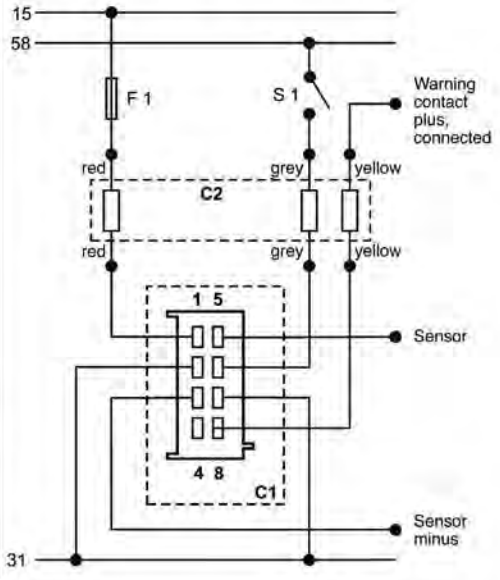


Connection 24 V

Variant 1: Warning contact minus, connected

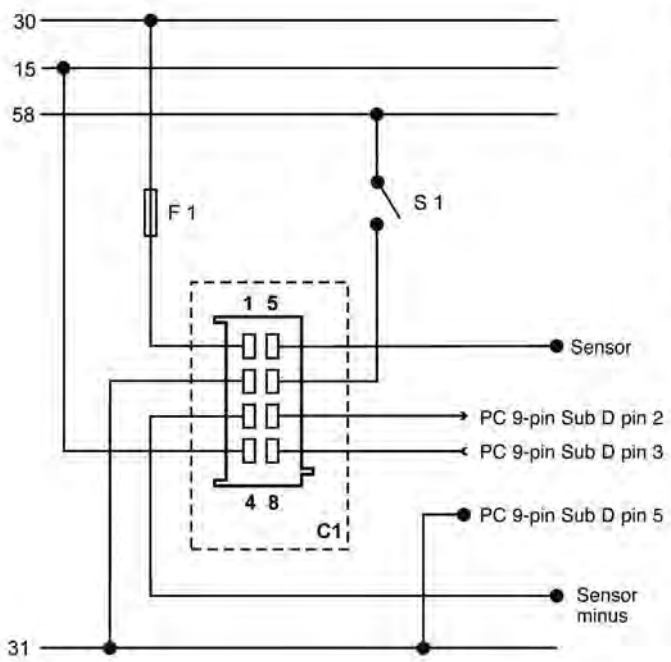


Variant 2: Warning contact plus, connected



VIEWLINE INSTALLATION 52MM (CONT...)

OUTSIDE TEMPERATURE GAUGE, CAPACITIVE FRESH WATER GAUGE, PYROMETER, BLACK WATER GAUGE AMMETER WITH SHUNT

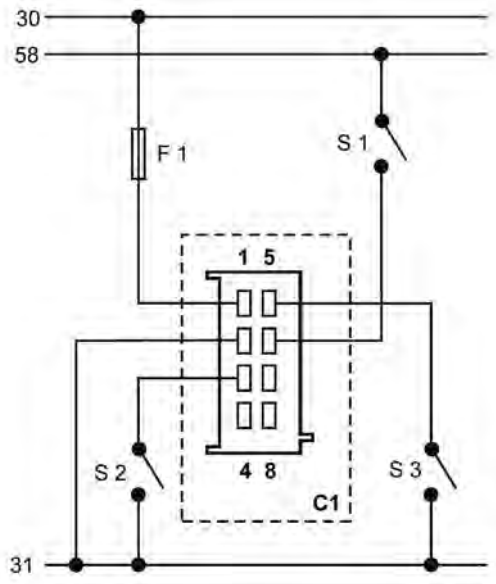


Designations in the wiring diagram:

30 - terminal 30 - steady-state plus 12/24 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector

You must comply with the wiring diagram.

CLOCK



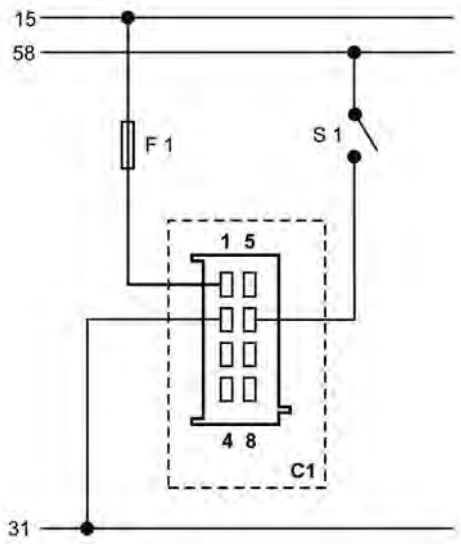
Designations in the wiring diagram:

30 - terminal 30 - steady-state plus 12 V
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
S2 - Clock setting, forwards
S3 - Clock setting, backwards
C1 - 8-pin MQS connector

You must comply with the wiring diagram.

VIEWLINE INSTALLATION 52MM (CONT...)

ENGINE HOUR METER

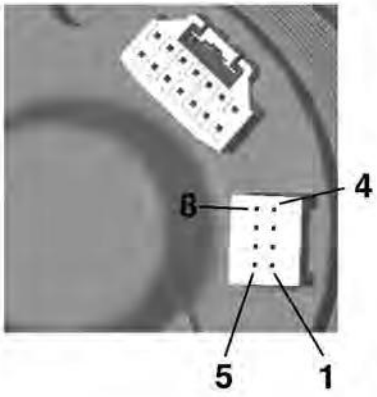


Designations in the wiring diagram:

15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector

You must comply with the wiring diagram.

RUDDER POSITION



Depending on the configuration, insert the cable into the 8-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

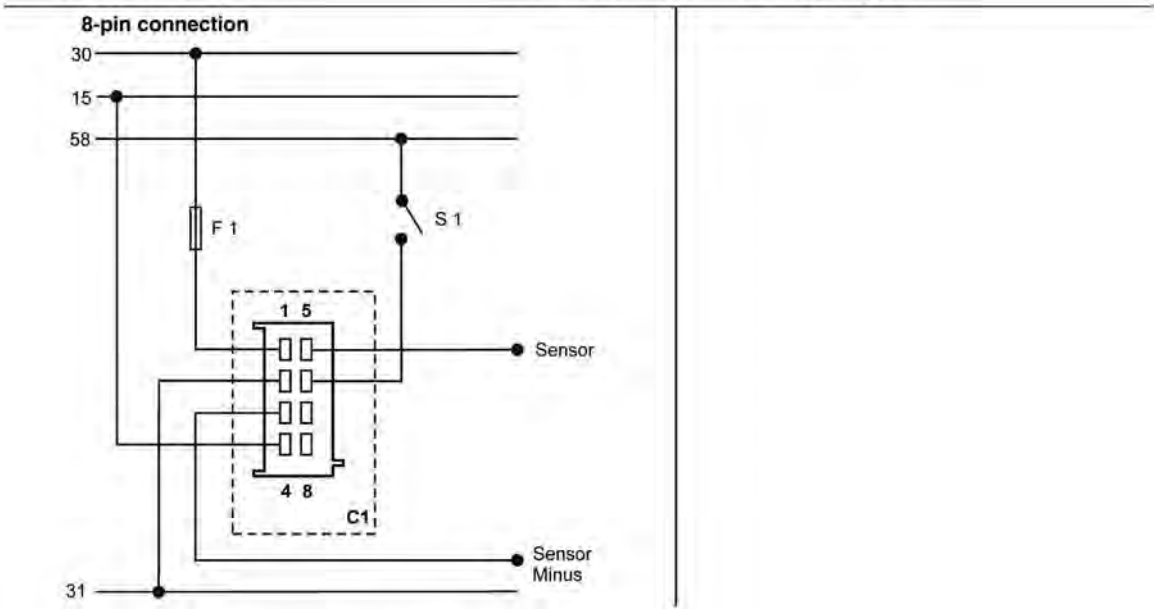
8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - unassigned
Pin 8 - unassigned

Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

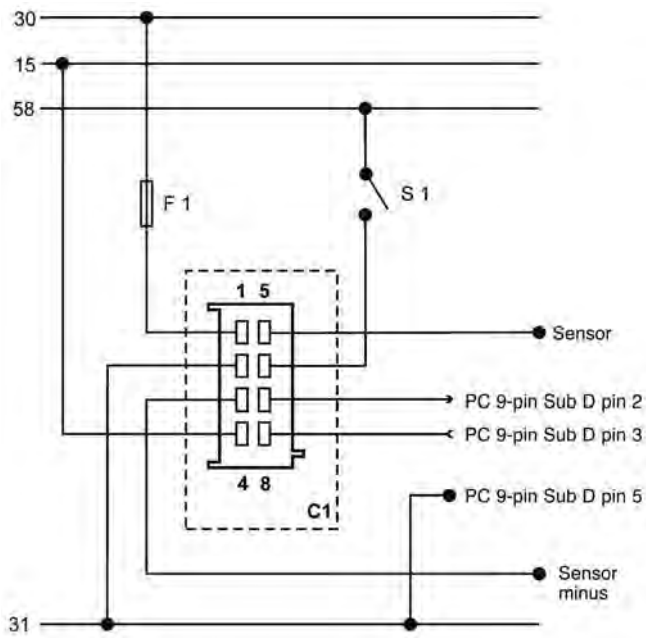
VIEWLINE INSTALLATION 52MM (CONT...)

RUDDER POSITION (CONT...)

Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
You must comply with the wiring diagram.



TACHOMETER



Designations in the wiring diagram:

30 - terminal 30 - steady-state plus 12/24 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector

You must comply with the wiring diagram.

Startup

Setting the impulse number

The revolution counter is factory-set to 6 impulses per revolution. Optionally available PC software can be used to change the number of impulses. Please contact your VDO partner for more information.

VIEWLINE INSTALLATION 52MM (CONT...)

TANK GAUGE FOR IMMERSION TUBE SENSOR

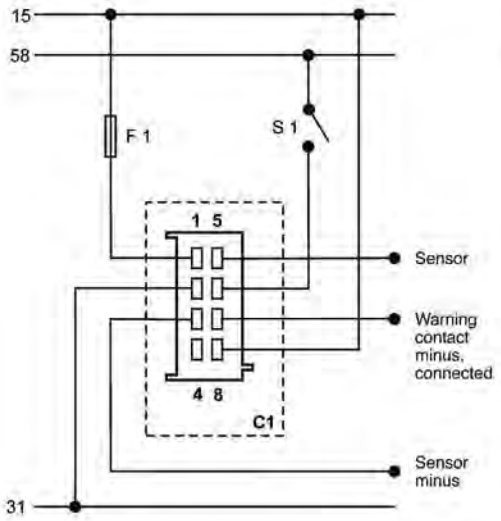
Temperature gauge, pressure gauge, rudder angel gauge, trim gauge, fuel gauge, fresh water gauge for level-type sensor

Designations in the wiring diagram:

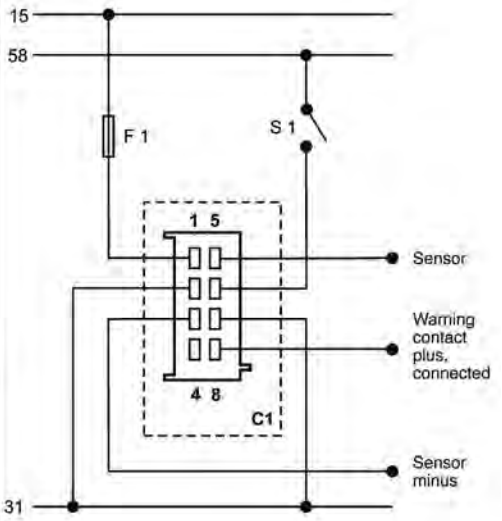
15 - terminal 15 - connected (ignition) plus 12 V
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
C2 - series resistor 24
You must comply with the wiring diagram.

Connection 12 V

Variant 1: Warning contact minus, connected

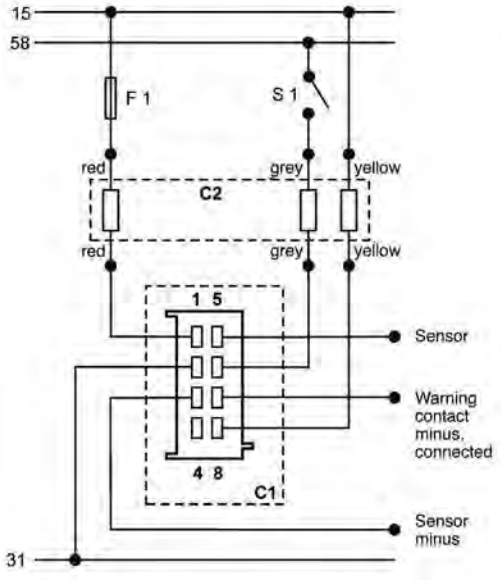


Variant 2: Warning contact plus, connected

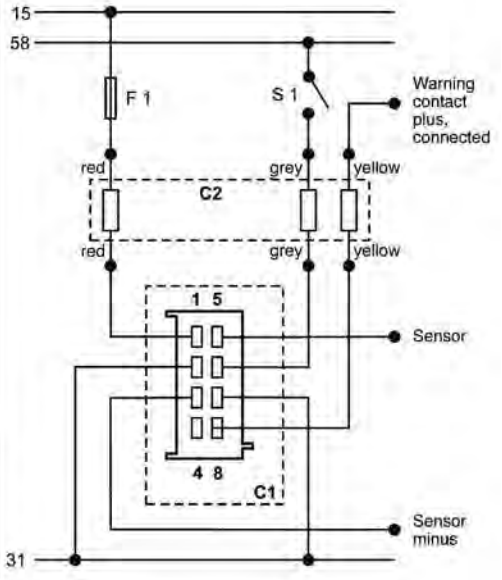


Connection 24 V

Variant 1: Warning contact minus, connected



Variant 2: Warning contact plus, connected



VIEWLINE INSTALLATION 52MM (CONT...)

TANK GAUGE FOR IMMERSION TUBE SENSOR

The gauge must be calibrated to the connected immersion tube sensor. Adjust the setting with an insulated screwdriver when the tank is **empty**. Rotate the potentiometer until the gauge reads empty (0 or E).
The potentiometer's setting range is between 60 and 90 .

VOLTMETER 12/24V

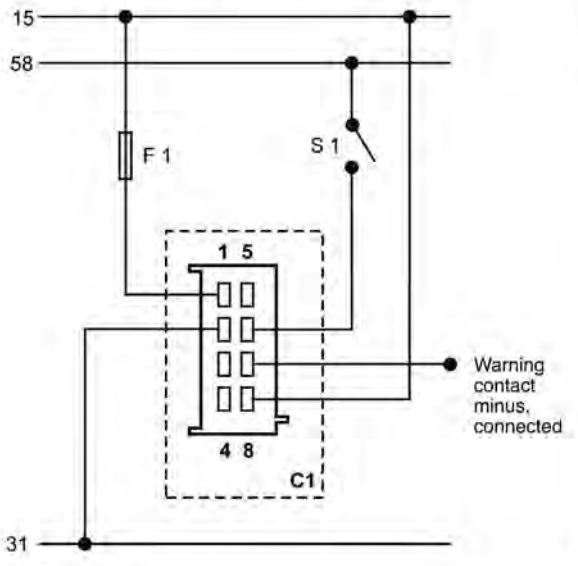
Designations in the wiring diagram:

15 - terminal 15 - connected (ignition) plus 12 V
58 - terminal 58 - lighting
31 - terminal 31 - ground

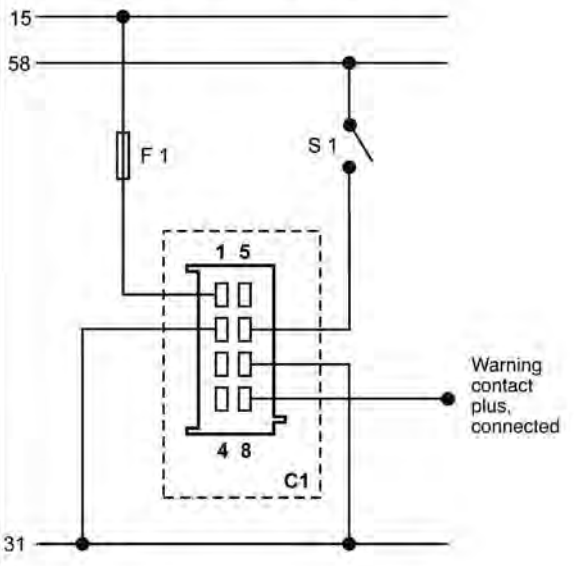
You must comply with the wiring diagram.

F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector

Connection Warning contact minus, connected



Connection Warning contact plus, connected



VIEWLINE INSTALLATION 85MM

Safety information

- The product was developed, manufactured and inspected according to the basic safety requirements of EC Guidelines and state-of-the-art technology.
- The unit is designed for use in grounded vehicles and machines as well as in nautical sports, including non-classified commercial shipping.
- Use our product only as intended. Use of the product for reasons other than its intended use may lead to personal injury, property damage or environmental damage. Before installation, check the vehicle documentation for vehicle type and any possible special features!
- Use the assembly plan to learn the location of the fuel/hydraulic/compressed air and electrical lines!
- Note possible modification to the vehicle, which must be considered during installation!
- To prevent personal injury, property damage or environmental damage, basic knowledge of motor vehicle/shipbuilding electronics and mechanics is required.
- Make sure that the engine cannot start unintentionally during installation!
- Modifications or manipulations to the VDO product can affect safety. Consequently, you may not modify or manipulate the product!
- When removing/installing seats, covers, etc., ensure that lines are not damaged and plug-in connections are not loosened!
- Note all data from other installed units with volatile electronic

Safety during installation:

- During installation, ensure that the product's components do not affect or limit vehicle functions. Avoid damaging these components!
- Only install undamaged parts in a vehicle!
- During installation, ensure that the product does not impair the field of vision and that it cannot impact the driver's or passenger's head!
- A specialized technician should install the product. If you install the product yourself, wear appropriate work clothing. Do not wear loose clothing, as it may get caught in moving parts. Protect long hair with a hair net.
- When working on the on-board electronics, do not wear metallic or conductive jewelry such as necklaces, bracelets, rings, etc.
- If work on a running engine is required, exercise extreme caution. Wear only appropriate work clothing as you are at risk of personal injury, resulting from being crushed or burned.
- Before taking any action, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.
- If working on gasoline boat motors, let the motor compartment fan run before beginning work.
- Pay attention to how lines and cable harnesses are laid so that you do not drill or saw through them!
- Do not choose to install the product in the mechanical and electrical airbag area!
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- When working underneath the vehicle, secure it according to the specifications from the vehicle manufacturer.
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary using taper milling tools, saber saw, keyhole saw or file. Debur edges. Follow the safety instructions of the tool manufacturer.
- Use only insulated tools, if work is necessary on live parts.
- Use only the multimeter or diode test lamps provided, to measure voltages and currents in the vehicle/machine or ship. Use of conventional test lamps can cause damage to control units or other electronic systems.

No Smoking! No open fire or lights!

- The electrical indicator outputs and cables connected to them must be protected from direct contact and damage. The cables in use must have sufficient insulation and electric strength and the contact points must be safe from touch.
- Use appropriate measures to also protect the electrically conductive parts on the connected consumer from direct contact. Laying metallic, uninsulated cables and contacts is prohibited.

Safety after installation:

- Connect the ground cable tightly to the negative terminal of the battery.
- Reenter/reprogram the volatile electronic memory values.
- Check all functions.
- Use only clean water to clean the components. Note the Ingress Protection (IP) ratings (IEC 60529).

Electrical connection:

- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cable, use the provided cable ducts and harnesses, however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Only use a soft soldering process or commercially available crimp connector to solder new cable connections!
- Only make crimp connections with cable crimping pliers. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and be sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

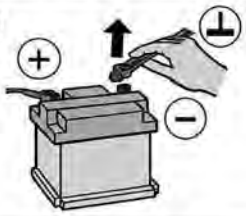
VIEWLINE INSTALLATION 85MM (CONT...)

Procedures for installing VDO Viewline instruments

1

Before beginning, turn off the ignition and remove the ignition key. If necessary, remove the main circuit switch.

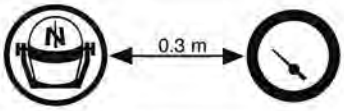
2



Disconnect the negative terminal on the battery. Make sure the battery cannot unintentionally restart.

- Before taking any action, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

3



If installing the instrument near a magnetic compass, note the magnetic safe distance to the compass.

4

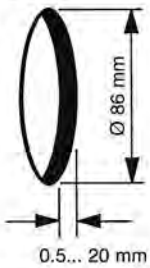
The following rings may be installed as alternatives to the supplied front ring:

Front ring, flat; black	A2C53192911
Front ring, flat; white	A2C53192912
Front ring, flat; chrome	A2C53192910
Front ring, triangular; black	A2C53192917
Front ring, triangular; white	A2C53192920
Front ring, triangular; chrome	A2C53192918
Front ring, round; black	A2C53192913
Front ring, round; white	A2C53192916
Front ring, round; chrome	A2C53192914

5

Place the new front ring on the instrument, rotate it until the ring's lip locks into the slots in the housing and press the front ring until it is flush with the instrument glass.

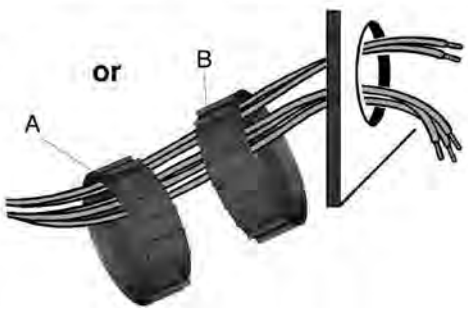
6



Conventional assembly. (Instrument is put into the drill hole from the front).
The panel width may be within a range of 0.5 to 20 mm.
The drill hole must have a diameter of 86 mm.

- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary using taper milling tools, saber saw, keyhole saw or file. Debur edges. Follow the safety instructions of the tool manufacturer.

7

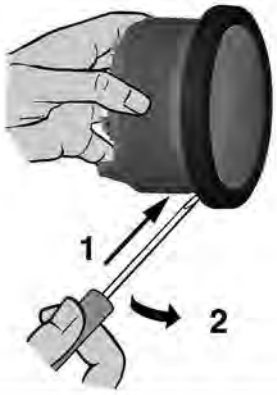


For 85 mm instruments, the fastening nut can be mounted at position A or B. This allows you to realize various clamping heights.

Version A	Panel bore 85.5 - 86 mm Circumferential lip away from instrument
Version B	Panel bore 80.5 - 81 mm Circumferential lip next to instrument

VIEWLINE INSTALLATION 85MM (CONT...)

8



If the instrument is mounted flush (i.e., from the back so that the instrument glass and the panel form one plane), the front ring must be removed. Press the instrument glass with both thumbs, while at the same time pressing the front ring forward from the instrument with both index fingers. Note the use of a tool in the adjacent figure.

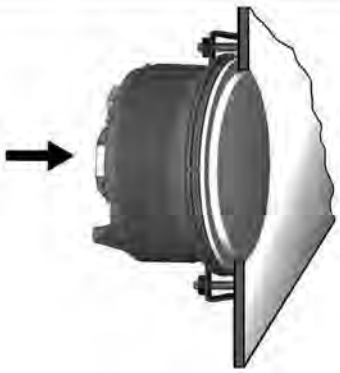
9

Flush assembly.

The recommended panel thickness is 1.5 to 3 mm. The drill hole must have a diameter of 75.4 mm. Ensure that the installation location is level and has no sharp edges.

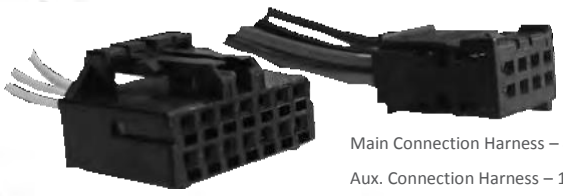
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary using taper milling tools, saber saw, keyhole saw or file. Debur edges. Follow the safety instructions of the tool manufacturer.

10



Place the flush mount seal A2C53215641 on the instrument glass.
Put the instrument into the drill hole from the back. Adjust the instrument so that the gauge is level and fasten it to the stud bolts on the rear side of the panel, using the flush mount fixing bracket A2C59510864.

11



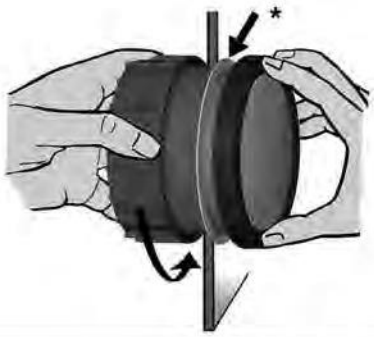
Main Connection Harness – 8 Pin A2C – 8 Way

Aux. Connection Harness – 14 Pin A2C – 14 Way

Electrical connection:

- Electrical connection:
- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cable, use the provided cable ducts and harnesses, however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Only use a soft soldering process or commercially available crimp connector to solder new cable connections!
- Only make crimp connections with cable crimping pliers. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

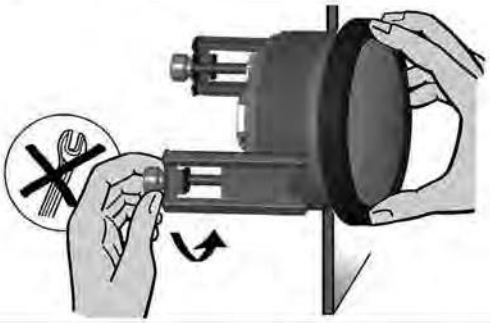
VIEWLINE INSTALLATION 85MM (CONT...)



Align the instrument and hand-tighten the fastening nut. Ensure that the nut is not tightened with a torque greater than 400 Ncm.

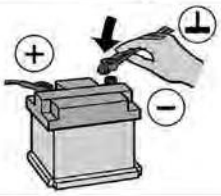
* Make sure the seal lays flat between the panel and the front ring.

If you would like to omit the fastening nut, you may use the part set A2C59510854 as an alternative. This is recommended if the installation location is subject to vibratory loads.
Screw the stud bolts into the provided drill holes in the enclosure. Max. stud bolt torque is 1.5 Nm



Place the bracket on the stud bolt and hand-tighten the knurled nut.

* Make sure the seal lays flat between the panel and the front ring (see Fig. 14).



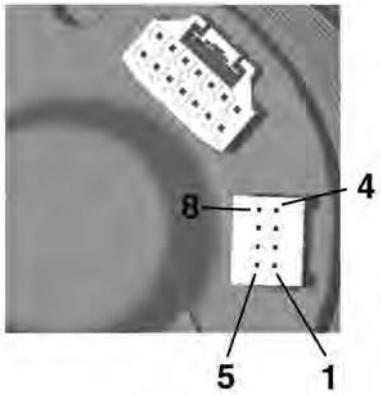
Close the battery after inspecting the connection.

- Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

If necessary, replace the main circuit switch. Turn on the ignition and conduct a functional test. Reprogram other instruments that may have lost their saved settings.

VIEWLINE INSTALLATION 85MM (CONT...)

RUDDER POSITION

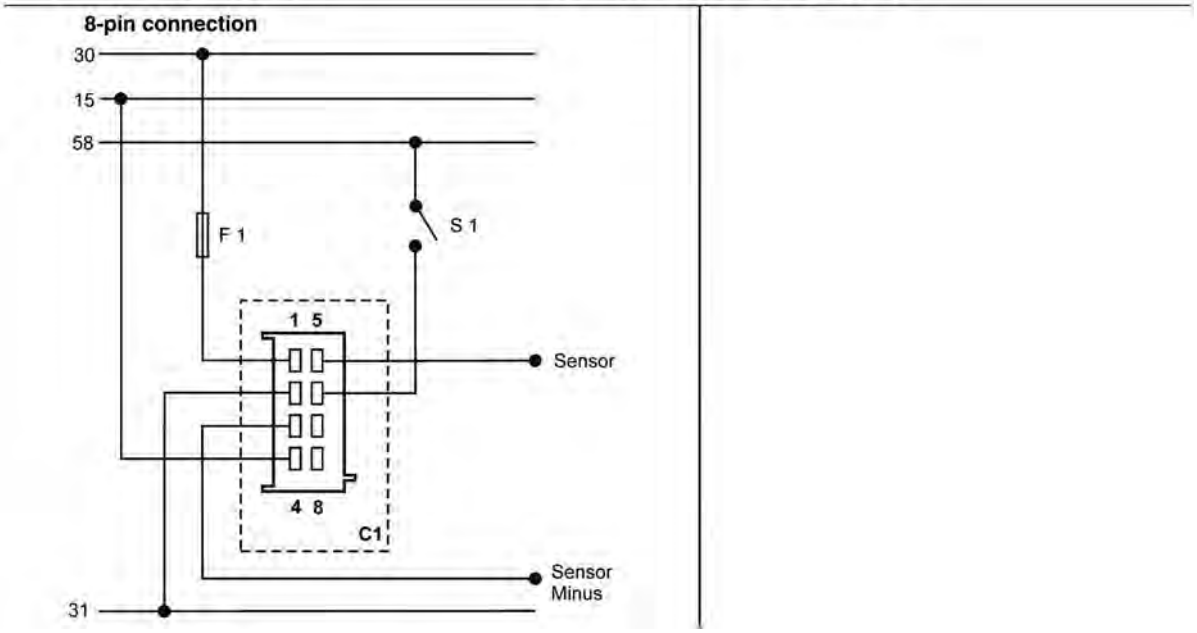


Depending on the configuration, insert the cable into the 8-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - unassigned
Pin 8 - unassigned

Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
You must comply with the wiring diagram.



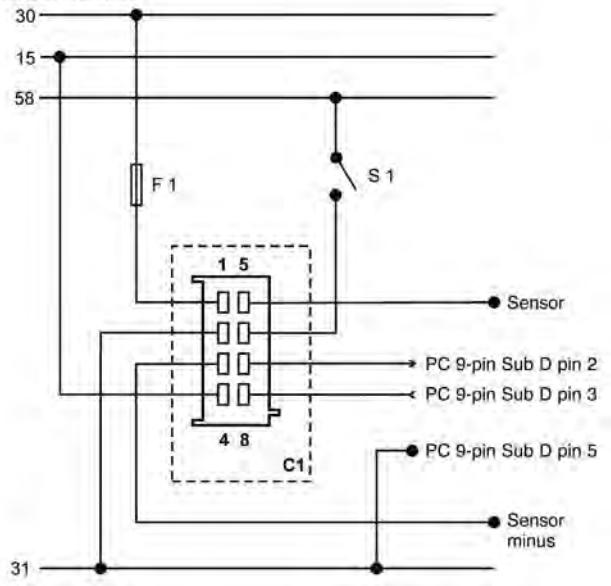
VIEWLINE INSTALLATION 85MM (CONT...)

SPEEDOMETER

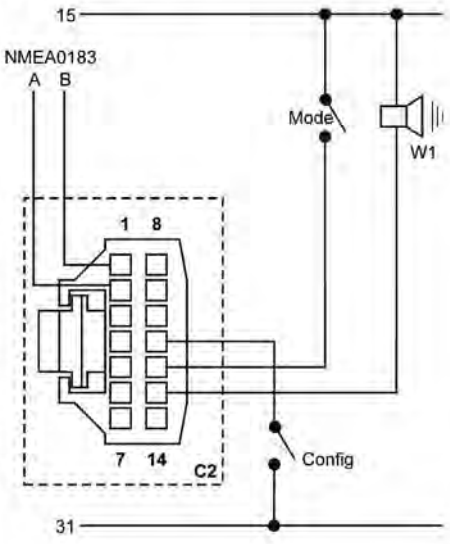
Designations in the wiring diagram:

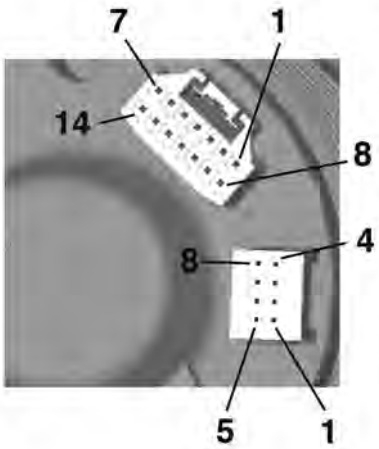
30 - terminal 30 - steady-state plus 12 V	F1 - fuse 5A quick-response	Config - Configuration key
15 - terminal 15 - connected (ignition) plus	S1 - light switch	Mode - Mode key
58 - terminal 58 - lighting	C1 - 8-pin MQS connector	W1 - Alarm output (max. 100 mA)
31 - terminal 31 - ground	C2 - 14-pin MQS connector	You must comply with the wiring diagram.

8-pin connection



14-pin connection





Depending on the configuration, insert the cable into the 8-pin and 14-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

8-pin contact housing

Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - warning LED ground
Pin 8 - warning LED plus

14-pin contact housing

Pin 1 - unassigned
Pin 2 - unassigned
Pin 3 - unassigned
Pin 4 - unassigned
Pin 5 - unassigned
Pin 6 - unassigned
Pin 7 - unassigned
Pin 8 - unassigned
Pin 9 - unassigned
Pin 10 - unassigned
Pin 11 - Configuration key
Pin 12 - Mode key
Pin 13 - Alarm output (max 100 mA)
Pin 14 - unassigned

Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

VIEWLINE INSTALLATION 85MM (CONT...)

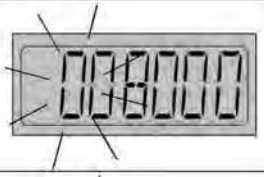
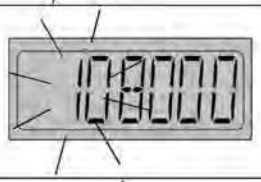
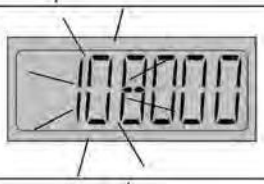
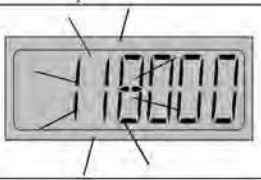
SPEEDOMETER (CONT...)

Operation

Basics: Press the key briefly (< 2sec.) to change the currently displayed value.
Press the key longer (> 2sec.) to change to the next value.
The display returns to normal operating mode if a key is not pressed for 30 seconds.
Any settings you have made are not saved.

Startup

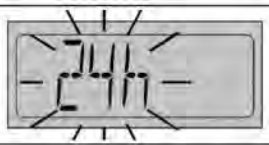
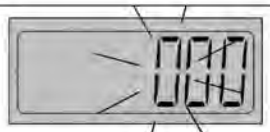
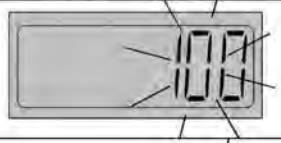
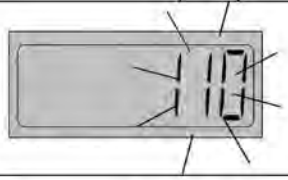
1. Setting the signal source and pulse count

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Config key (14-pin - Pin 11)
	Activate T. 15 Release Config key
	Press and hold Config key
	Press the Config. key to changeover between the frequency input (8-pole plug, Pin 5) and the NMEA0183 input (14-pole plug, Pins 1 and 2). Press Config key briefly
	Press and hold Config key
	Set impulse number is displayed, the first digit flashes. Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press Config key briefly
	The next lower digit flashes Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete impulse number is set Press and hold Config key
	Deactivate T. 15. This saves the impulse number in the display.

VIEWLINE INSTALLATION 85MM (CONT...)

SPEEDOMETER (CONT...)

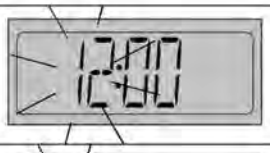
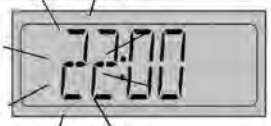
2. Setting the unit and alarm threshold

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Mode key (14-pin - Pin 12)
	Activate T. 15 Release Mode key
	Press and hold Mode key
	By briefly pressing the Mode key, you can switch between 24h and 12h (AM/PM) clock format. Press and hold Mode key
	Press Mode key briefly
	Press and hold Mode key
	Set alarm threshold is displayed; the first digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Mode key
	The next lower digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete alarm threshold is set. Press and hold Mode key
	Deactivate T. 15. This saves the unit and the alarm threshold in the display.

VIEWLINE INSTALLATION 85MM (CONT...)

SPEEDOMETER (CONT...)

3. Setting the clock

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the time is displayed
	Press and hold Mode key
	Set time is displayed; the first digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press and hold Mode key
	The next lower digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the correct time is set
	Press and hold Mode key
	Clock is set. Important: If T. 30 (8-pin - Pin1) is deactivated, the clock no longer runs.

4. Setting the brightness

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the on-board voltage is displayed
	
	Press and hold Mode key
	Press the Mode key repeatedly until the desired brightness is reached The brightness can be set between 0 (OFF) to 10 (max).
	
	Press and hold Mode key
	The desired brightness is now permanently set.

VIEWLINE INSTALLATION 85MM (CONT...)

SPEEDOMETER (CONT...)

In operation

1. Display indicator selection

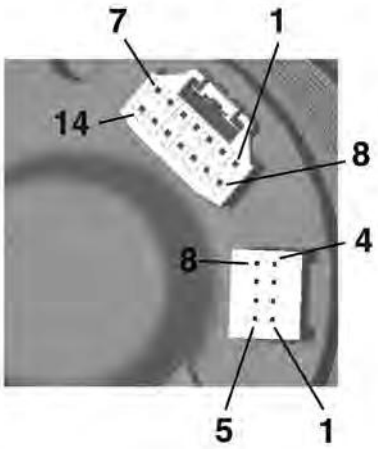
	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
Odometer 	Press Mode key briefly
Tripometer 	Press Mode key briefly
Time 	Press Mode key briefly
On-board voltage 	

2. Resetting the day counter

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the trip distance are displayed
	Press and hold Mode key
	Trip is now deleted.

VIEWLINE INSTALLATION 85MM (CONT...)

SUMLOG



Depending on the configuration, insert the cable into the 8-pin and 14-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

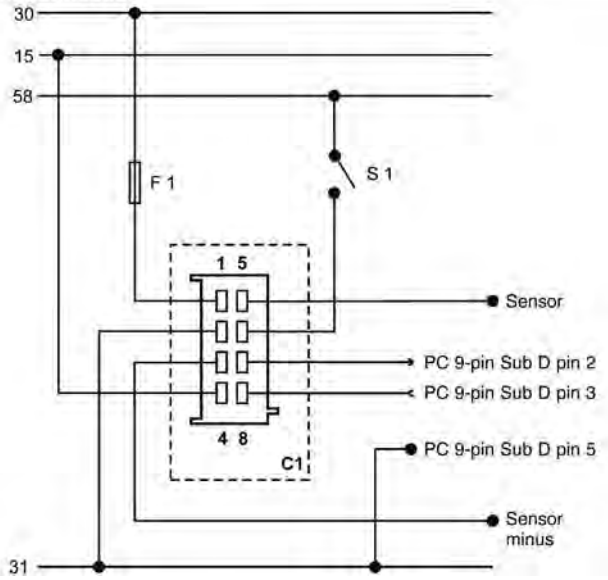
8-pin contact housing
Pin 1 - T. 30 - battery12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - warning LED ground
Pin 8 - warning LED plus

14-pin contact housing
Pin 1 - NMEA0183-B
Pin 2 - NMEA0183-A
Pin 3 - unassigned
Pin 4 - unassigned
Pin 5 - unassigned
Pin 6 - unassigned
Pin 7 - unassigned
Pin 8 - unassigned
Pin 9 - unassigned
Pin 10 - unassigned
Pin 11 - Configuration key
Pin 12 - Mode key
Pin 13 - Alarm output (max 100 mA)
Pin 14 - unassigned

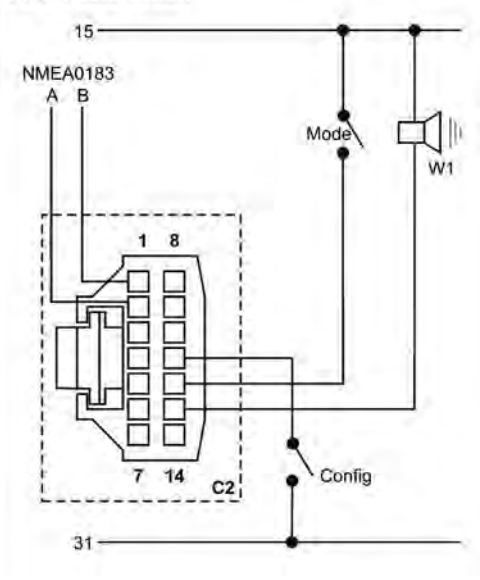
Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
C2 - 14-pin MQS connector
Config - Configuration key
Mode - Mode key
W1 - Alarm output (max. 100 mA)
You must comply with the wiring diagram.

8-pin connection



14-pin connection



VIEWLINE INSTALLATION 85MM (CONT...)

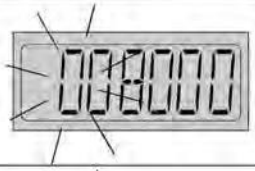
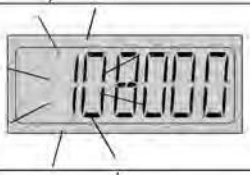
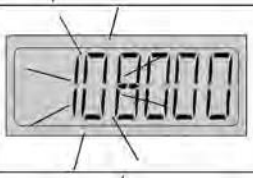
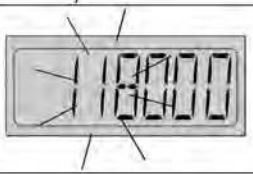
SUMLOG (CONT...)

Operation

Basics: Press the key briefly (< 2sec.) to change the currently displayed value.
Press the key longer (> 2sec.) to change to the next value.
The display returns to normal operating mode if a key is not pressed for 30 seconds.
Any settings you have made are not saved.

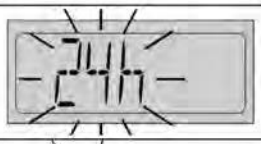
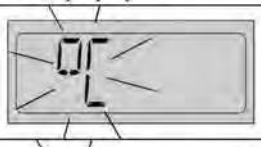
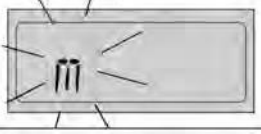
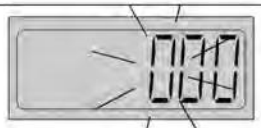
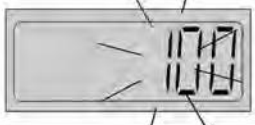
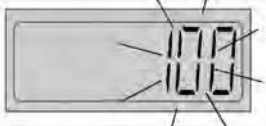
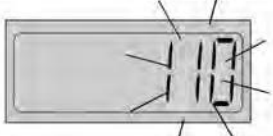
Startup

1. Setting the signal source and pulse count

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Config key (14-pin - Pin 11)
	Activate T. 15 Release Config key
	
	Press and hold Config key
	Press the Config. key to changeover between the frequency input (8-pole plug, Pin 5) and the NMEA0183 input (14-pole plug, Pins 1 and 2).
	Press Config key briefly
	
	Press and hold Config key
	Set impulse number is displayed, the first digit flashes.
	Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press Config key briefly
	The next lower digit flashes
	Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the complete impulse number is set
	Press and hold Config key
	Deactivate T. 15. This saves the impulse number in the display.

VIEWLINE INSTALLATION 85MM (CONT...)

SUMLOG (CONT...)

2. Setting the unit and alarm threshold	
	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Mode key (14-pin - Pin 12)
	Activate T. 15 Release Mode key
	Press and hold Mode key
	By briefly pressing the Mode key, you can switch between 24h and 12h (AM/PM) clock format. Press and hold Mode key
	Press the Mode key to change the water temperature unit from °C to °F. Press and hold Mode key
	Press Mode key briefly to change the water depth unit from von m to ft. Press and hold Mode key
	Press Mode key briefly
	Press and hold Mode key
	Set alarm threshold is displayed; the first digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Mode key
	The next lower digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete alarm threshold is set. Press and hold Mode key
	Deactivate T. 15. This saves the unit and the alarm threshold in the display.

VIEWLINE INSTALLATION 85MM (CONT...)

SUMLOG (CONT...)

In operation

1. Display indicator selection

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
Odometer 	Press Mode key briefly
Tripometer 	Press Mode key briefly
Depth 	Press Mode key briefly
Time 	Press Mode key briefly
Water temperature 	Press Mode key briefly
On-board voltage 	

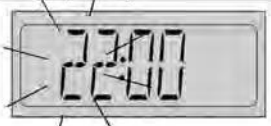
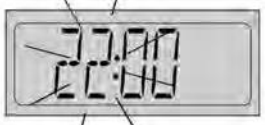
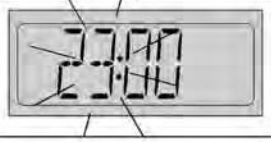
2. Resetting the day counter

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the trip distance are displayed
	Press and hold Mode key
	Trip is now deleted.

VIEWLINE INSTALLATION 85MM (CONT...)

SUMLOG (CONT...)

3. Setting the clock

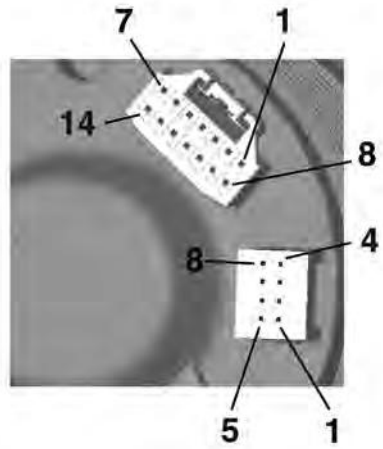
	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the time is displayed
	Press and hold Mode key
	Set time is displayed; the first digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press and hold Mode key
	The next lower digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the correct time is set
	Press and hold Mode key
	Clock is set. Important: If T. 30 (8-pin - Pin1) is deactivated, the clock no longer runs.

4. Setting the brightness

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the on-board voltage is displayed
	
	Press and hold Mode key
	Press the Mode key repeatedly until the desired brightness is reached The brightness can be set between 0 (OFF) to 10 (max).
	
	Press and hold Mode key
	The desired brightness is now permanently set.

VIEWLINE INSTALLATION 85MM (CONT...)

SYNCHRONISER



Depending on the configuration, insert the cable into the 8-pin and 14-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

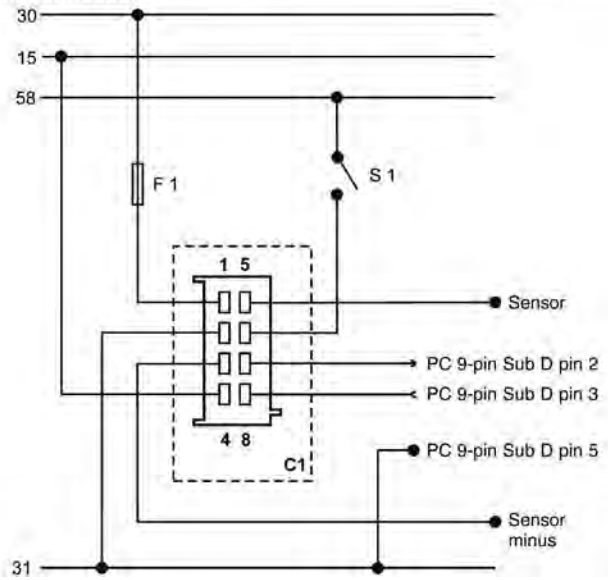
8-pin contact housing
Pin 1 - T. 30 - battery12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - warning LED ground
Pin 8 - warning LED plus

14-pin contact housing
Pin 1 - NMEA0183-B
Pin 2 - NMEA0183-A
Pin 3 - unassigned
Pin 4 - unassigned
Pin 5 - unassigned
Pin 6 - unassigned
Pin 7 - unassigned
Pin 8 - unassigned
Pin 9 - unassigned
Pin 10 - unassigned
Pin 11 - Configuration key
Pin 12 - Mode key
Pin 13 - Alarm output (max 100 mA)
Pin 14 - unassigned

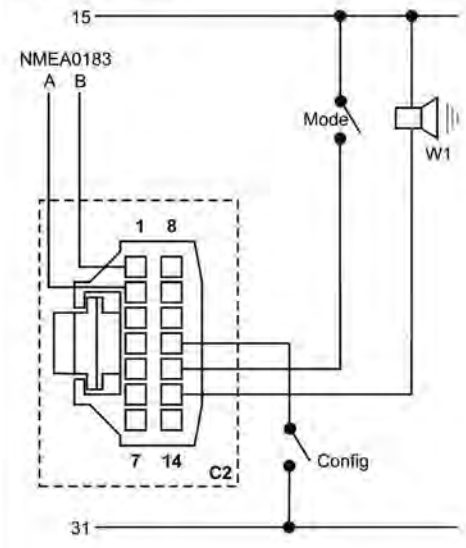
Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

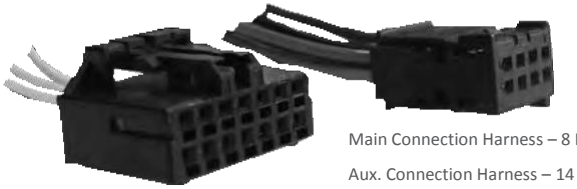
Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
C2 - 14-pin MQS connector
Config - Configuration key
Mode - Mode key
W1 - Alarm output (max. 100 mA)
You must comply with the wiring diagram.

8-pin connection



14-pin connection



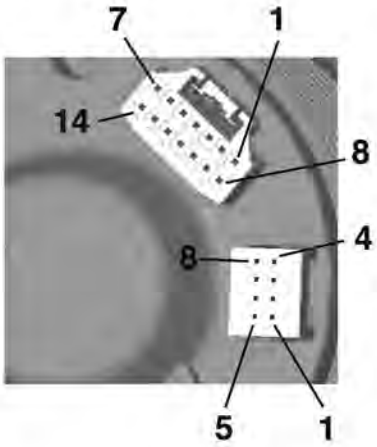


Main Connection Harness – 8 Pin A2C – 8 Way

Aux. Connection Harness – 14 Pin A2C – 14 Way

VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY



Depending on the configuration, insert the cable into the 8-pin and 14-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

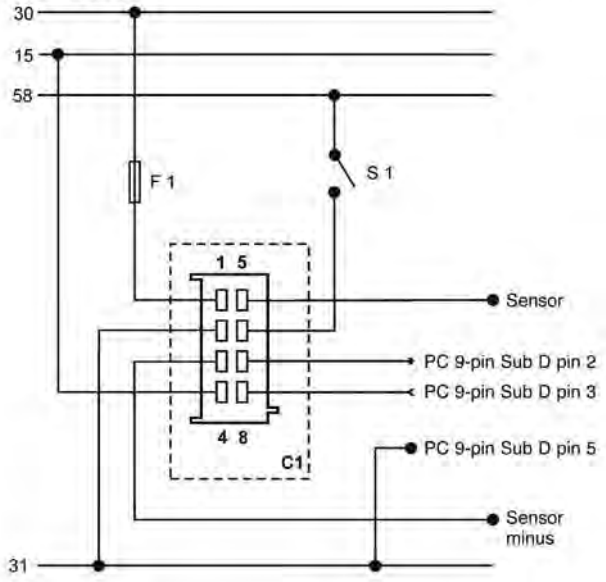
8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - warning LED ground
Pin 8 - warning LED plus

14-pin contact housing
Pin 1 - unassigned
Pin 2 - unassigned
Pin 3 - unassigned
Pin 4 - unassigned
Pin 5 - unassigned
Pin 6 - unassigned
Pin 7 - unassigned
Pin 8 - unassigned
Pin 9 - unassigned
Pin 10 - unassigned
Pin 11 - Configuration key
Pin 12 - Mode key
Pin 13 - Alarm output (max 100 mA)
Pin 14 - unassigned

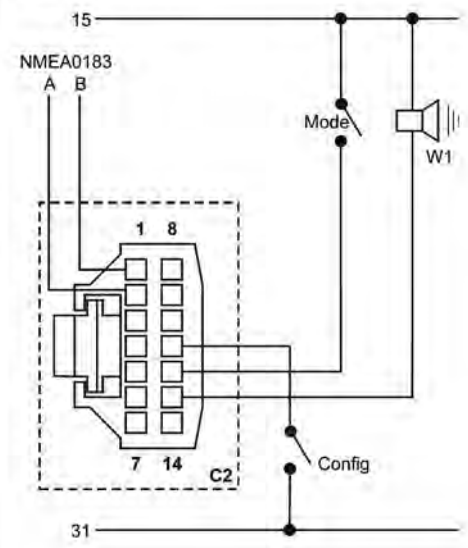
Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
C2 - 14-pin MQS connector
Config - Configuration key
Mode - Mode key
W1 - Alarm output (max. 100 mA)
You must comply with the wiring diagram.

8-pin connection



14-pin connection



VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY (CONT...)

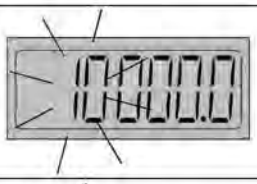
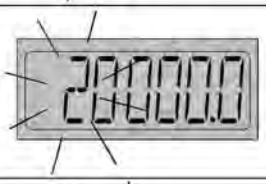
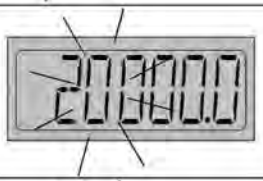
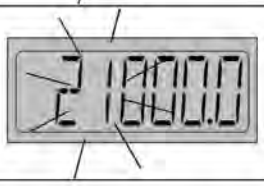
Operation

Basics:

Press the key briefly (< 2sec.) to change the currently displayed value.
Press the key longer (> 2sec.) to change to the next value.
The display returns to normal operating mode if a key is not pressed for 30 seconds.
Any settings you have made are not saved.

Startup

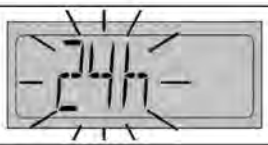
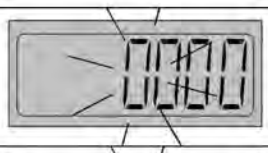
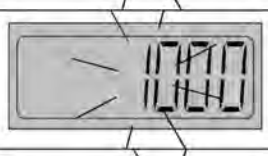
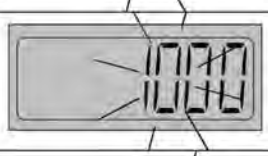
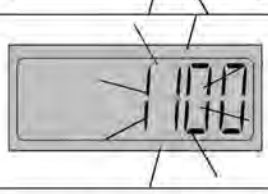
1. Setting the impulse number

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Config key (14-pin - Pin 11)
	Activate T. 15 Release Config key
	
	Press and hold Config key
	Set impulse number is displayed, the first digit flashes.
	Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press Config key briefly
	The next lower digit flashes
	Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the complete impulse number is set
	Press and hold Config key
	Deactivate T. 15. This saves the impulse number in the display.

VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY (CONT...)

2. Setting the unit and alarm threshold

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Mode key (14-pin - Pin 12)
	Activate T. 15 Release Mode key
	Press and hold Mode key
	By briefly pressing the Mode key, you can switch between 24h and 12h (AM/PM) clock format. Press and hold Mode key
	Press Mode key briefly
	Press and hold Mode key
	Set alarm threshold is displayed; the first digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Mode key
	The next lower digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete alarm threshold is set. Press and hold Mode key
	Deactivate T. 15. This saves the unit and the alarm threshold in the display.

VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY (CONT...)

In operation

1. Display indicator selection

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
Total operating hours 	Press Mode key briefly
Trip hours 	Press Mode key briefly
Time 	Press Mode key briefly
On-board voltage 	

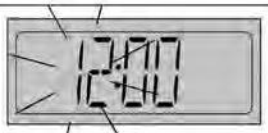
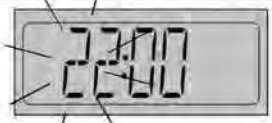
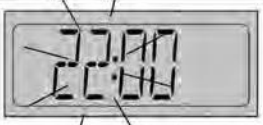
2. Resetting the day counter

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the trip hours are displayed
	Press and hold Mode key
	Trip is now deleted.

VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY (CONT...)

3. Setting the clock

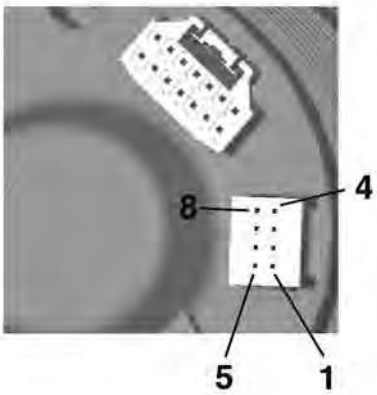
	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the time is displayed
	Press and hold Mode key
	Set time is displayed; the first digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press and hold Mode key
	The next lower digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the correct time is set
	Press and hold Mode key
	Clock is set. Important: If T. 30 (8-pin - Pin1) is deactivated, the clock no longer runs.

4. Setting the brightness

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the on-board voltage is displayed
	
	Press and hold Mode key
	Press the Mode key repeatedly until the desired brightness is reached The brightness can be set between 0 (OFF) to 10 (max).
	
	Press and hold Mode key
	The desired brightness is now permanently set.

VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY (CONT...)



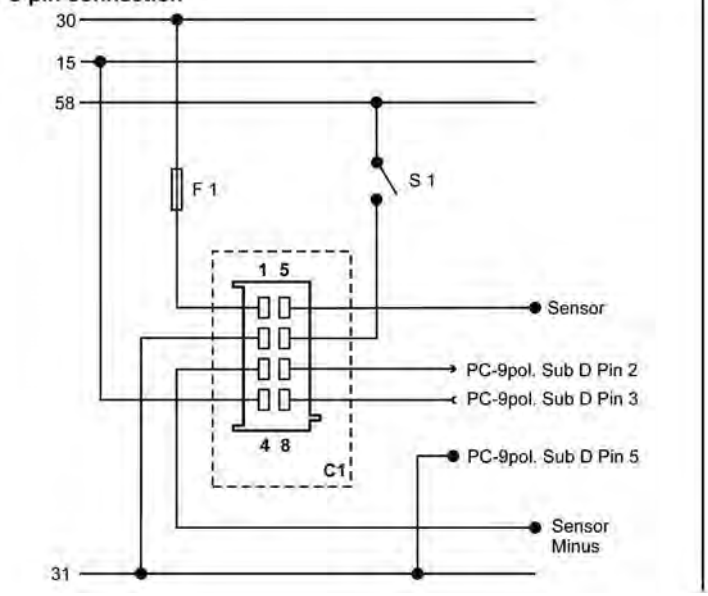
Depending on the configuration, insert the cable into the 8-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - programming port Tx
Pin 8 - programming port Rx

Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
You must comply with the wiring diagram.

8-pin connection

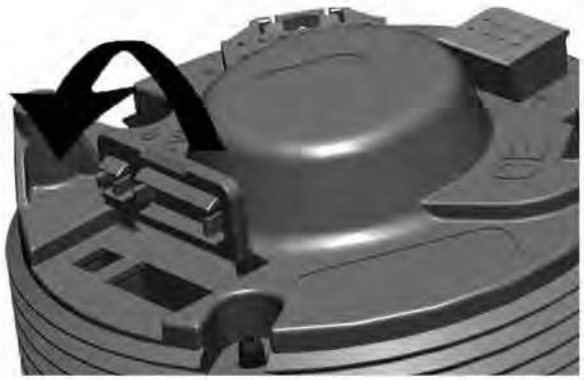


VIEWLINE INSTALLATION 85MM (CONT...)

TACHOURMETER - WITH DISPLAY (CONT...)

Startup

Setting the impulse number



1. Activate T. 30 (8-pin - Pin 1)
2. Deactivate T. 15 (8-pin - Pin 1)

Set the impulse number according to the following table.
Ensure that switch position "1" points toward the center of the instrument.

Select switch position "XXX" if you want to set an impulse number with the optional PC software.

Code table: Viewline Tachometer without LCD

Imp / R	Switch 1	Switch 2	Switch 3
XXX	0	0	0
1	1	0	0
2	0	1	0
3	1	1	0
4	0	0	1
5	1	0	1
6	0	1	1
8	1	1	1

VIEWLINE INSTALLATION 110MM

Safety information

- The product was developed, manufactured and inspected according to the basic safety requirements of EC Guidelines and state-of-the-art technology.
- The unit is designed for use in grounded vehicles and machines as well as in nautical sports, including non-classified commercial shipping.
- Use our product only as intended. Use of the product for reasons other than its intended use may lead to personal injury, property damage or environmental damage. Before installation, check the vehicle documentation for vehicle type and any possible special features!
- Use the assembly plan to learn the location of the fuel/hydraulic/compressed air and electrical lines!
- Note possible modification to the vehicle, which must be considered during installation!
- To prevent personal injury, property damage or environmental damage, basic knowledge of motor vehicle/shipbuilding electronics and mechanics is required.
- Make sure that the engine cannot start unintentionally during installation!
- Modifications or manipulations to the VDO product can affect safety. Consequently, you may not modify or manipulate the product!
- When removing/installing seats, covers, etc., ensure that lines are not damaged and plug-in connections are not loosened!
- Note all data from other installed units with volatile electronic

Safety during installation:

- During installation, ensure that the product's components do not affect or limit vehicle functions. Avoid damaging these components!
- Only install undamaged parts in a vehicle!
- During installation, ensure that the product does not impair the field of vision and that it cannot impact the driver's or passenger's head!
- A specialized technician should install the product. If you install the product yourself, wear appropriate work clothing. Do not wear loose clothing, as it may get caught in moving parts. Protect long hair with a hair net.
- When working on the on-board electronics, do not wear metallic or conductive jewelry such as necklaces, bracelets, rings, etc.
- If work on a running engine is required, exercise extreme caution. Wear only appropriate work clothing as you are at risk of personal injury, resulting from being crushed or burned.
- Before taking any action, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.
- If working on gasoline boat motors, let the motor compartment fan run before beginning work.
- Pay attention to how lines and cable harnesses are laid so that you do not drill or saw through them!
- Do not choose to install the product in the mechanical and electrical airbag area!
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- When working underneath the vehicle, secure it according to the specifications from the vehicle manufacturer.
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary using taper milling tools, saber saw, keyhole saw or file. Debur edges. Follow the safety instructions of the tool manufacturer.
- Use only insulated tools, if work is necessary on live parts.
- Use only the multimeter or diode test lamps provided, to measure voltages and currents in the vehicle/machine or ship. Use of conventional test lamps can cause damage to control units or other electronic systems.

No Smoking! No open fire or lights!

- The electrical indicator outputs and cables connected to them must be protected from direct contact and damage. The cables in use must have sufficient insulation and electric strength and the contact points must be safe from touch.
- Use appropriate measures to also protect the electrically conductive parts on the connected consumer from direct contact. Laying metallic, uninsulated cables and contacts is prohibited.

Safety after installation:

- Connect the ground cable tightly to the negative terminal of the battery.
- Reenter/reprogram the volatile electronic memory values.
- Check all functions.
- Use only clean water to clean the components. Note the Ingress Protection (IP) ratings (IEC 60529).

Electrical connection:

- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cable, use the provided cable ducts and harnesses, however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Only use a soft soldering process or commercially available crimp connector to solder new cable connections!
- Only make crimp connections with cable crimping pliers. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and be sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

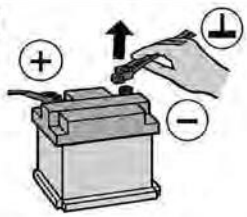
VIEWLINE INSTALLATION 110MM (CONT...)

Procedures for installing VDO Viewline instruments

1

Before beginning, turn off the ignition and remove the ignition key. If necessary, remove the main circuit switch.

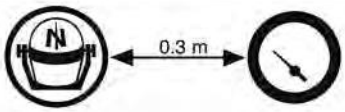
2



Disconnect the negative terminal on the battery. Make sure the battery cannot unintentionally restart.

- Before taking any action, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

3



If installing the instrument near a magnetic compass, note the magnetic safe distance to the compass.

4

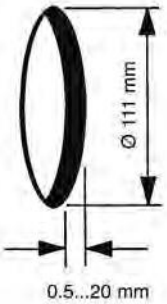
The following rings may be installed as alternatives to the supplied front ring:

Front ring, flat; black	A2C53210745
Front ring, flat; white	A2C53210746
Front ring, flat; chrome	A2C53210747
Front ring, triangular; black	A2C53210763
Front ring, triangular; white	A2C53210764
Front ring, triangular; chrome	A2C53210765
Front ring, round; black	A2C53210749
Front ring, round; white	A2C53210760
Front ring, round; chrome	A2C53210761

5

Place the new front ring on the instrument, rotate it until the ring's lip locks into the slots in the housing and press the front ring until it is flush with the instrument glass.

6

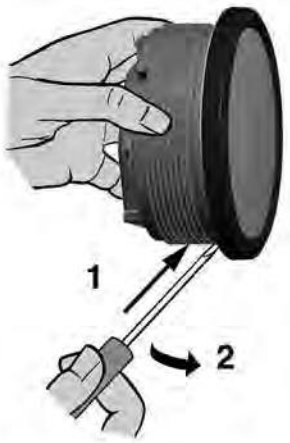


Conventional assembly. (Instrument is put into the drill hole from the front).
The panel width may be within a range of 0.5 to 20 mm.
The drill hole must have a diameter of 111 mm.

- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary using taper milling tools, saber saw, keyhole saw or file. Debur edges. Follow the safety instructions of the tool manufacturer.

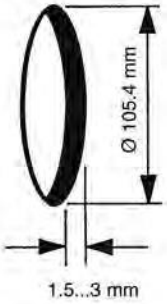
VIEWLINE INSTALLATION 110MM (CONT...)

7



If the instrument is mounted flush (i.e., from the back so that the instrument glass and the panel form one plane), the front ring must be removed. Press the instrument glass with both thumbs, while at the same time pressing the front ring forward from the instrument with both index fingers. Note the use of a tool in the adjacent figure.

8

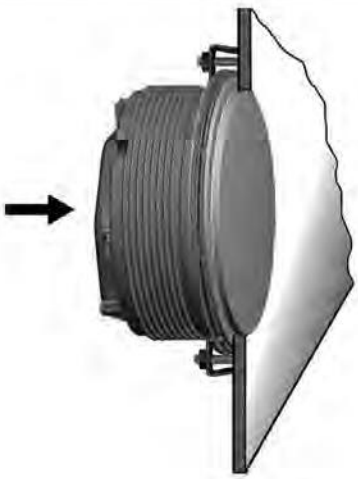


Flush Montage.

The recommended panel thickness is 1.5 to 3 mm. The drill hole must have a diameter of 105.4 mm. Ensure that the installation location is level and has no sharp edges.

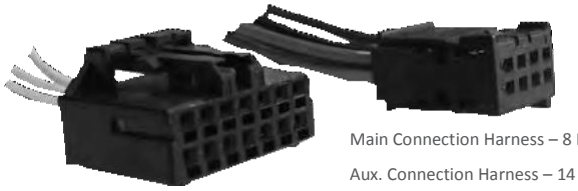
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Note the necessary clearance behind the drill hole or port at the installation location. Required mounting depth: 65 mm.
- Drill small ports; enlarge and complete them, if necessary using taper milling tools, saber saw, keyhole saw or file. Debur edges. Follow the safety instructions of the tool manufacturer.

9



Place the flush mount seal A2C53215641 on the instrument glass.
Put the instrument into the drill hole from the back. Adjust the instrument so that the gauge is level and fasten it to the stud bolts on the rear side of the panel, using the flush mount fixing bracket A2C59510864.

VIEWLINE INSTALLATION 110MM (CONT...)



Main Connection Harness – 8 Pin A2C – 8 Way

Aux. Connection Harness – 14 Pin A2C – 14 Way

Electrical connection:

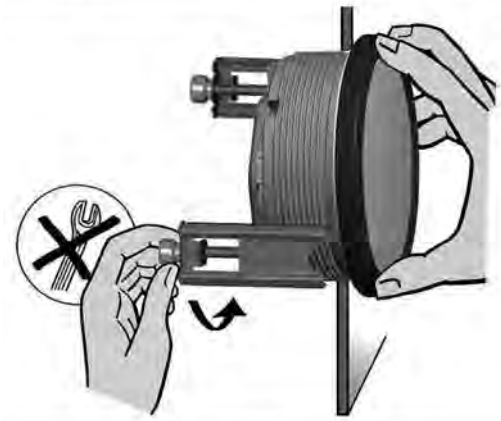
- Electrical connection:
- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cable, use the provided cable ducts and harnesses, however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Only use a soft soldering process or commercially available crimp connector to solder new cable connections!
- Only make crimp connections with cable crimping pliers. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

Align the instrument and hand-tighten the fastening nut. Ensure that the nut is not tightened with a torque greater than 400 Ncm.

* Make sure the seal lays flat between the panel and the front ring.

VIEWLINE INSTALLATION 110MM (CONT...)

If you would like to omit the fastening nut, you may use the part set A2C59510854 as an alternative. This is recommended if the installation location is subject to vibratory loads.
Screw the stud bolts into the provided drill holes in the enclosure. Max. stud bolt torque is 1.5 Nm



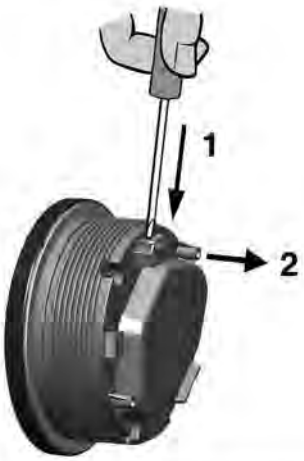
Place the bracket on the stud bolt and hand-tighten the knurled nut.
* Make sure the seal lays flat between the panel and the front ring (see Fig. 13).

Close the battery after inspecting the connection.

- Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

If necessary, replace the main circuit switch. Turn on the ignition and conduct a functional test. Reprogram other instruments that may have lost their saved settings.

VIEWLINE INSTALLATION 110MM (CONT...)



To remove the connector, press the latch (**1**) and pull the connector out (**2**).

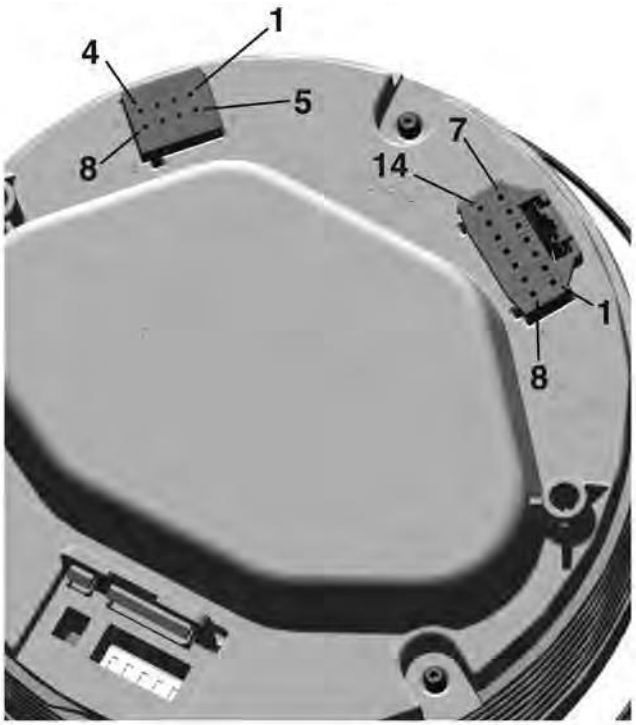
Important: Clean the instrument glass and front frame with water only. Do not use chemical agents.

Accessories / Spare parts

Bush contacts 0.25 – 0.5 mm²	A2C59510846	Fastening nut	A2C53238881
Bush housing, 8-pin	A2C59510847	Front ring, flat; black	A2C53210745
Bush housing, 14-pin	A2C59510848	Front ring, flat; white	A2C53210746
Hand pliers	Tyco No. 539635-1	Front ring, flat; chrome	A2C53210747
Tool for hand pliers	Tyco No. 539682-2.	Front ring, triangular; black	A2C53210763
Single contacts 0.14 – 0.22 mm²	Tyco No. 1355718-1	Front ring, triangular; white	A2C53210764
Single contacts 0.5 – 0.75 mm²	Tyco No. 963729-1	Front ring, triangular; chrome	A2C53210765
Strip 0.14 – 0.22 mm²	Tyco No. 1355717-1	Front ring, round; black	A2C53210749
Strip 0.25 – 0.5 mm²	Tyco No. 928999-1	Front ring, round; white	A2C53210760
Strip 0.5 – 0.75 mm²	Tyco No. 963715-1	Front ring, round; chrome	A2C53210761
Bracket assembly mounting set	A2C59510854	Protective connector cap, 8-pin	A2C53324664
Flush mount fixing bracket	A2C59510864	Protective connector cap, 14-pin	A2C53324671
Flush mount seal	A2C53215642		

VIEWLINE INSTALLATION 110MM (CONT...)

SPEEDOMETER



Now insert the plug into the gauge.
Note the inverse polarity protection nose in the process.

Depending on the configuration, insert the cable into the 8-pin and 14-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

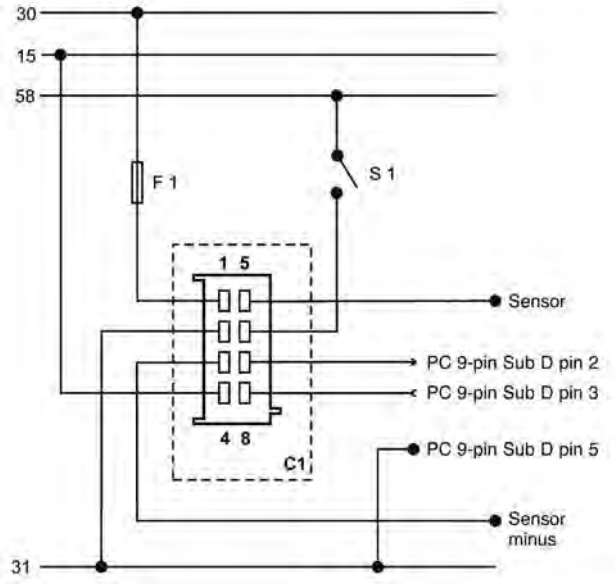
8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - programming port Tx
Pin 8 - programming port Rx

14-pin contact housing
Pin 1 - unassigned
Pin 2 - unassigned
Pin 3 - unassigned
Pin 4 - unassigned
Pin 5 - unassigned
Pin 6 - unassigned
Pin 7 - unassigned
Pin 8 - unassigned
Pin 9 - unassigned
Pin 10 - unassigned
Pin 11 - Configuration key
Pin 12 - Mode key
Pin 13 - Alarm output (max 100 mA)
Pin 14 - unassigned

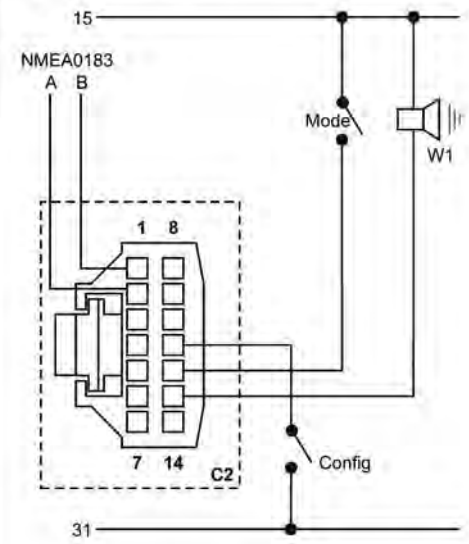
Designation in the wiring diagram

30 - terminal 30 - steady-state plus 12 V	F1 - fuse 5A quick-response	Config - Configuration key
15 - terminal 15 - connected (ignition) plus	S1 - light switch	Mode - Mode key
58 - terminal 58 - lighting	C1 - 8-pin MQS connector	W1 - Alarm output (max. 100 mA)
31 - terminal 31 - ground	C2 - 14-pin MQS connector	You must comply with the wiring diagram.

8-pin connection



14-pin connection



VIEWLINE INSTALLATION 110MM (CONT...)

SPEEDOMETER (CONT...)

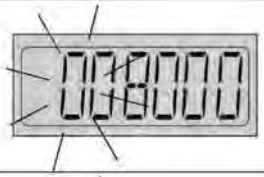
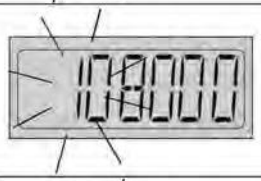
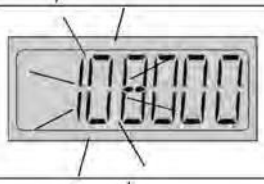
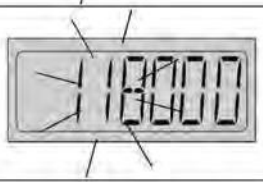
Operation

Basics:

Press the key briefly (< 2sec.) to change the currently displayed value.
Press the key longer (> 2sec.) to change to the next value.
The display returns to normal operating mode if a key is not pressed for 30 seconds.
Any settings you have made are not saved.

Startup

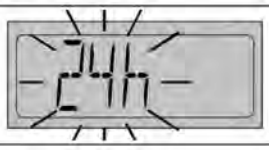
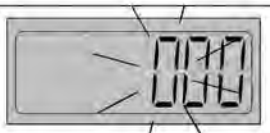
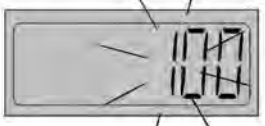
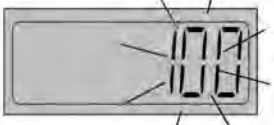
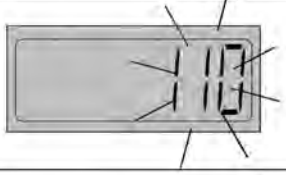
1. Setting the signal source and pulse count

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Config key (14-pin - Pin 11)
	Activate T. 15 Release Config key
	Press and hold Config key
	Press the Config. key to changeover between the frequency input (8-pole plug, Pin 5) and the NMEA0183 input (14-pole plug, Pins 1 and 2). Press Config key briefly
	Press and hold Config key
	Set impulse number is displayed; the first digit flashes Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Config key
	The next lower digit flashes Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete impulse number is set Press and hold Config key
	Deactivate T. 15. This saves the impulse number in the display.

VIEWLINE INSTALLATION 110MM (CONT...)

SPEEDOMETER (CONT...)

2. Setting the unit and alarm threshold

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Mode key (14-pin - Pin 12)
	Activate T. 15 Release Mode key
	Press and hold Mode key
	By briefly pressing the Mode key, you can switch between 24h and 12h (AM/PM) clock format. Press and hold Mode key
	Press Mode key briefly
	Press and hold Mode key
	Set alarm threshold is displayed; the first digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Mode key
	The next lower digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete alarm threshold is set. Press and hold Mode key
	Deactivate T. 15. This saves the unit and the alarm threshold in the display.

VIEWLINE INSTALLATION 110MM (CONT...)

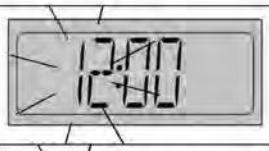
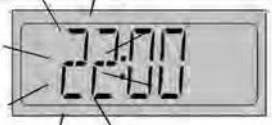
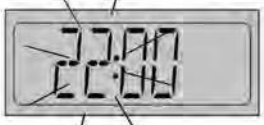
SPEEDOMETER (CONT...)

In operation **1. Display indicator selection**	
	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
Odometer 	
	Press Mode key briefly
Tripometer 	
	Press Mode key briefly
Time 	
	Press Mode key briefly
On-board voltage 	
2. Resetting the day counter	
	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the trip distance are displayed
	
	Press and hold Mode key
	
	Trip is now deleted.

VIEWLINE INSTALLATION 110MM (CONT...)

SPEEDOMETER (CONT...)

3. Setting the clock

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the time is displayed
	Press and hold Mode key
	Set time is displayed; the first digit flashes
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press and hold Mode key
	The next lower digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the correct time is set
	Press and hold Mode key
	Clock is set. Important: If T. 30 (8-pin - Pin1) is deactivated, the clock no longer runs.

4. Setting the brightness

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the on-board voltage is displayed
	
	Press and hold Mode key
	Press the Mode key repeatedly until the desired brightness is reached The brightness can be set between 0 (OFF) to 10 (max).
	
	Press and hold Mode key
	The desired brightness is now permanently set.

VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITHOUT DISPLAY

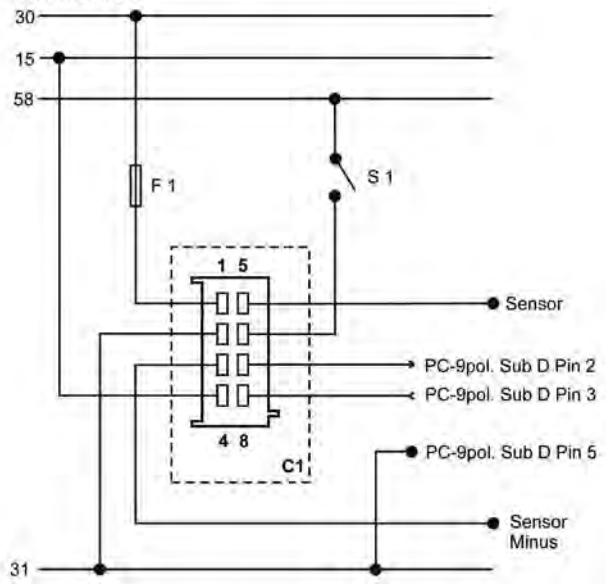
Depending on the configuration, insert the cable into the 8-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - programming port Tx
Pin 8 - programming port Rx

Now insert the plug into the gauge. Note the inverse polarity protection nose in the process.

Designations in the wiring diagram:
30 - terminal 30 - steady-state plus 12 V
15 - terminal 15 - connected (ignition) plus
58 - terminal 58 - lighting
31 - terminal 31 - ground
F1 - fuse 5A quick-response
S1 - light switch
C1 - 8-pin MQS connector
You must comply with the wiring diagram.

8-pin connection



VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITHOUT DISPLAY (CONT...)

Startup

Setting the impulse number

1. Activate T. 30 (8-pin - Pin 1)
2. Deactivate T. 15 (8-pin - Pin 1)

Set the impulse number according to the following table.
Ensure that the switch position "1" points toward the center of the instrument.

Select switch position "XXX" if you want to set an impulse number with the optional PC software.

Code table: Viewline Tachometer without LCD

Imp / R	Switch 1	Switch 2	Switch 3
XXX	0	0	0
1	1	0	0
2	0	1	0
3	1	1	0
4	0	0	1
5	1	0	1
6	0	1	1
8	1	1	1

VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITH DISPLAY (CONT...)

Now insert the plug into the gauge.
Note the inverse polarity protection nose in the process.

Depending on the configuration, insert the cable into the 8-pin and 14-pin contact housing according to the following pin assignment. The contacts must audibly lock into place.

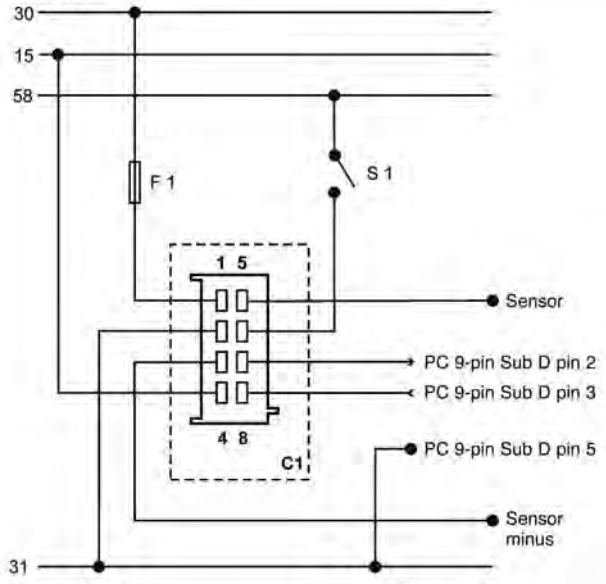
8-pin contact housing
Pin 1 - T. 30 - battery 12/24 V
Pin 2 - T. 31 - ground
Pin 3 - signal ground
Pin 4 - T. 15 - ignition plus
Pin 5 - sensor signal
Pin 6 - T. 58 - lighting
Pin 7 - programming port Tx
Pin 8 - programming port Rx

14-pin contact housing
Pin 1 - unassigned
Pin 2 - unassigned
Pin 3 - unassigned
Pin 4 - unassigned
Pin 5 - unassigned
Pin 6 - unassigned
Pin 7 - unassigned
Pin 8 - unassigned
Pin 9 - unassigned
Pin 10 - unassigned
Pin 11 - Configuration key
Pin 12 - Mode key
Pin 13 - Alarm output (max 100 mA)
Pin 14 - unassigned

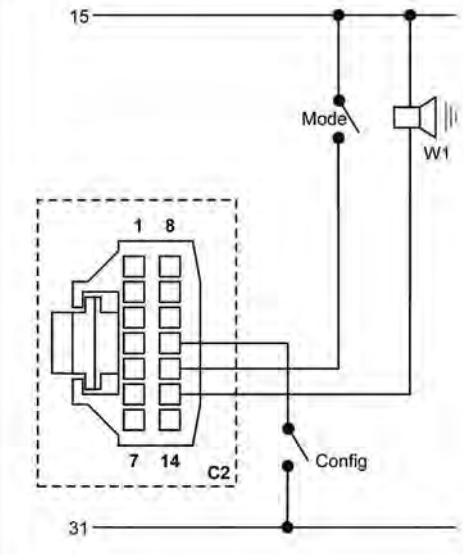
Designations in the wiring diagram:

30 - terminal 30 - steady-state plus 12 V	F1 - fuse 5A quick-response	Config - Configuration key
15 - terminal 15 - connected (ignition) plus	S1 - light switch	Mode - Mode key
58 - terminal 58 - lighting	C1 - 8-pin MQS connector	W1 - Alarm output (max. 100 mA)
31 - terminal 31 - ground	C2 - 14-pin MQS connector	You must comply with the wiring diagram.

8-pin connection



14-pin connection



VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITH DISPLAY (CONT...)

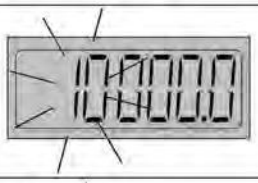
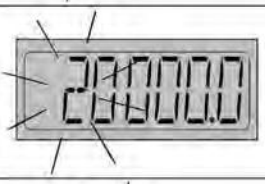
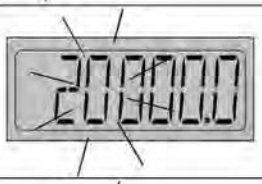
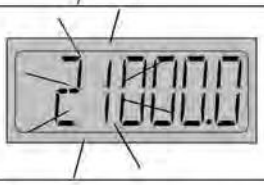
Operation

Basics:

Press the key briefly (< 2sec.) to change the currently displayed value.
Press the key longer (> 2sec.) to change to the next value.
The display returns to normal operating mode if a key is not pressed for 30 seconds.
Any settings you have made are not saved.

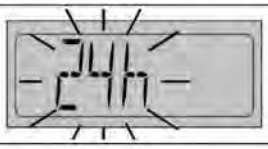
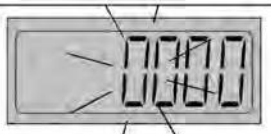
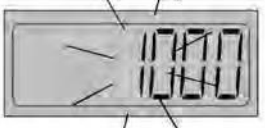
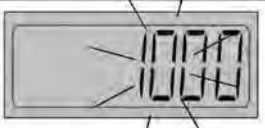
Startup

1. Setting the impulse number

	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Config key (14-pin - Pin 11)
	Activate T. 15 Release Config key
	Press and hold Config key
	Set impulse number is displayed; the first digit flashes Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Config key
	The next lower digit flashes Press Config key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete impulse number is set Press and hold Config key
	Deactivate T. 15. This saves the impulse number in the display.

VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITH DISPLAY (CONT...)

2. Setting the unit and alarm threshold	
	1. Activate T. 30 (8-pin - Pin1) 2. Deactivate T. 15 (8-pin - Pin4) 3. Press and hold Mode key (14-pin - Pin 12)
	Activate T. 15 Release Mode key
	Press and hold Mode key
	By briefly pressing the Mode key, you can switch between 24h and 12h (AM/PM) clock format. Press and hold Mode key
	Press Mode key briefly
	Press and hold Mode key
	Set alarm threshold is displayed; the first digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Press and hold Mode key
	The next lower digit flashes. Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0" Continue until the complete alarm threshold is set. Press and hold Mode key
	Deactivate T. 15. This saves the unit and the alarm threshold in the display.

VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITH DISPLAY (CONT...)

In operation

1. Display indicator selection

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
Total operating hours 	
	Press Mode key briefly
Trip hours 	
	Press Mode key briefly
Time 	
	Press Mode key briefly
On-board voltage 	

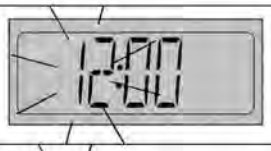
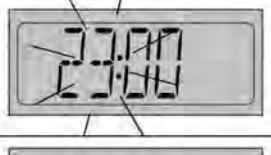
2. Resetting the day counter

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the trip hours are displayed
	
	Press and hold Mode key
	
	Trip is now deleted.

VIEWLINE INSTALLATION 110MM (CONT...)

TACHOMETER - WITH DISPLAY (CONT...)

3. Setting the clock

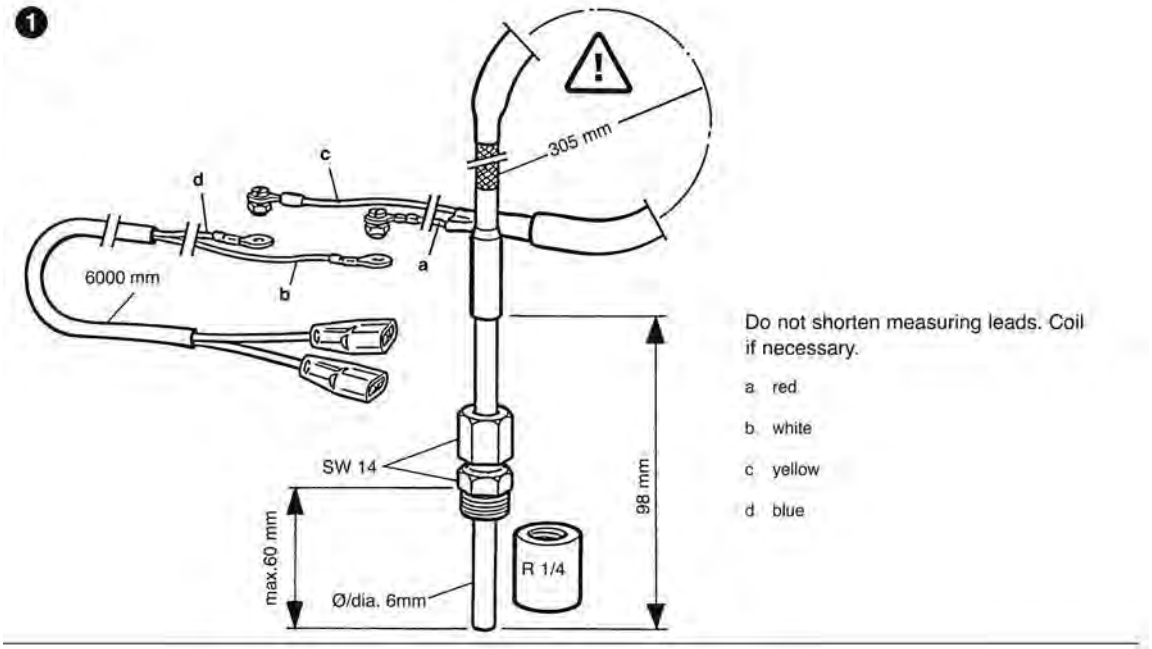
	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the time is displayed
	Press and hold Mode key
	Set time is displayed; the first digit flashes
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Press and hold Mode key
	The next lower digit flashes.
	Press Mode key briefly
	The flashing digit increases by 1. If the flashing digit is "9", the display returns to "0"
	Continue until the correct time is set
	Press and hold Mode key
	Clock is set. Important: If T. 30 (8-pin - Pin1) is deactivated, the clock no longer runs.

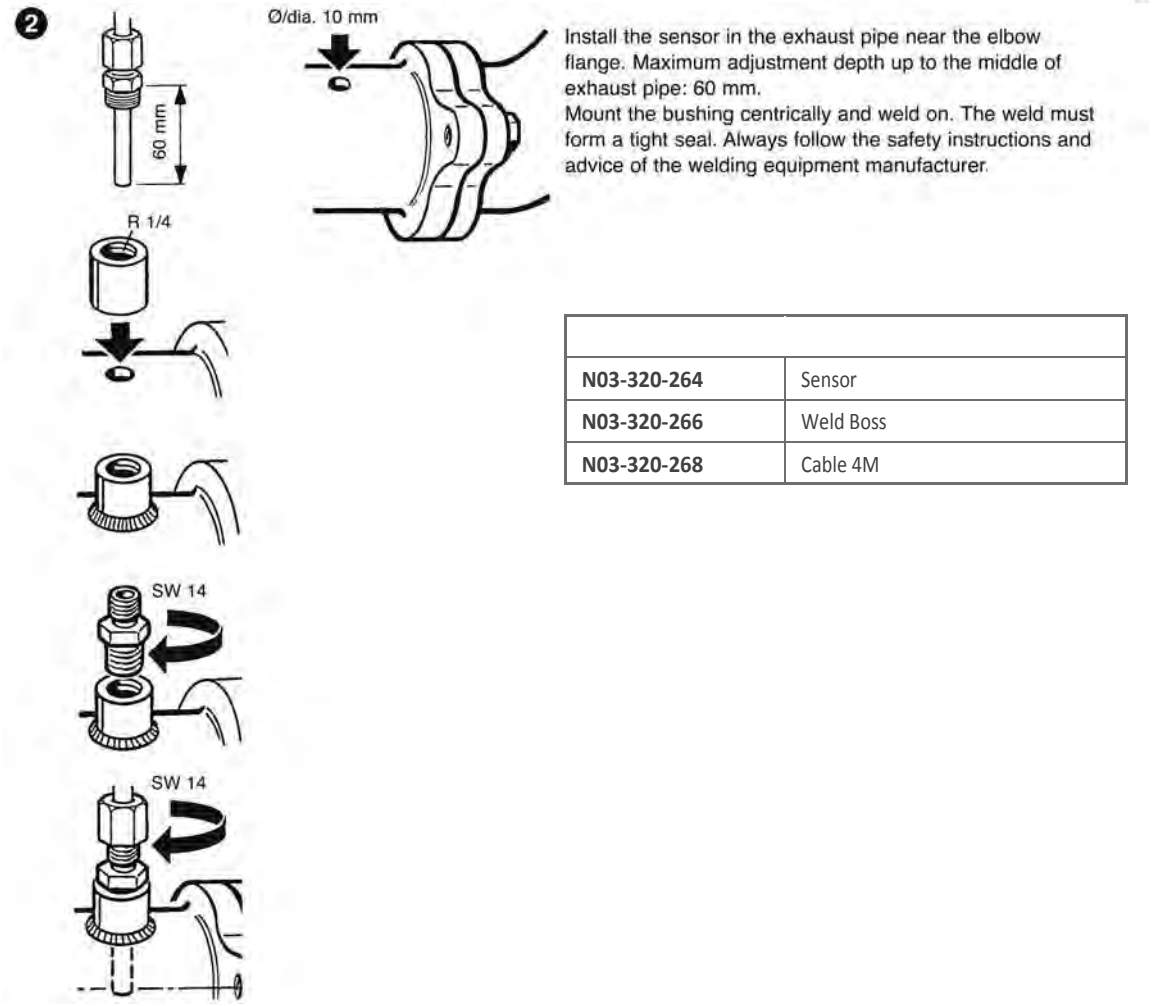
4. Setting the brightness

	1. Activate T. 30 (8-pin - Pin1) 2. Activate T. 15 (8-pin - Pin4)
	Press the Mode key repeatedly until the on-board voltage is displayed
	
	Press and hold Mode key
	Press the Mode key repeatedly until the desired brightness is reached The brightness can be set between 0 (OFF) to 10 (max).
	
	Press and hold Mode key
	The desired brightness is now permanently set.

VIEWLINE INSTALLATION – SENSORS

PYROMETER SENSOR



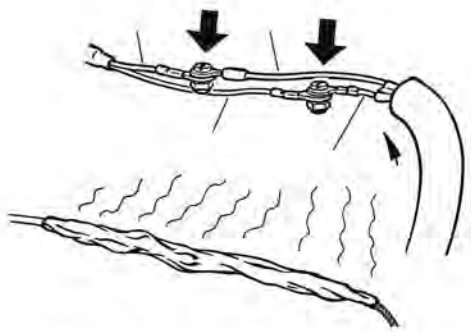


N03-320-264	Sensor
N03-320-266	Weld Boss
N03-320-268	Cable 4M

VIEWLINE INSTALLATION – SENSORS (CONT...)

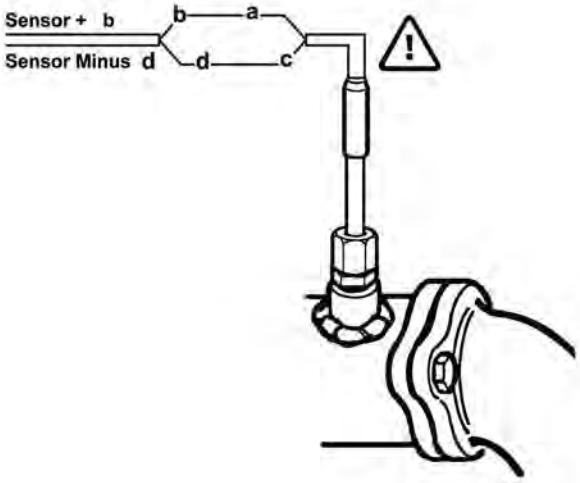
PYROMETER SENSOR (CONT...)

❷



Slide the heat-shrinkable sleeve over the cable connections and then heat with a hot-air fan over the entire length until it shrinks. Always follow the safety advice of the hot-air fan manufacturer.

❸

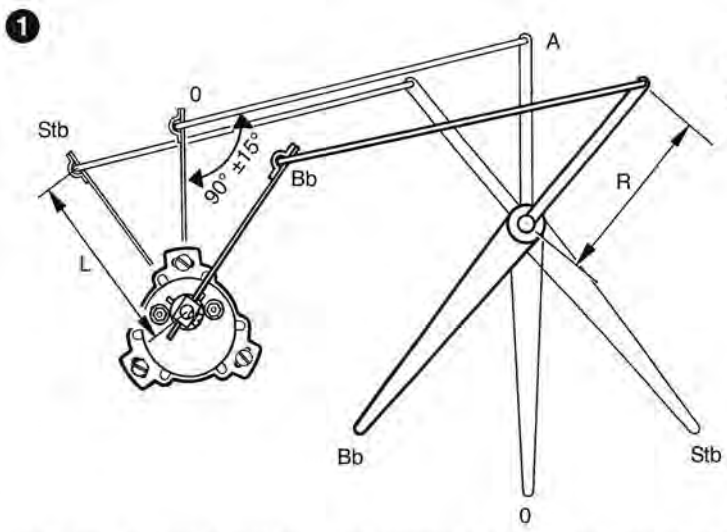


Do not shorten measuring lead.

a red
b white
c yellow
d blue

VIEWLINE INSTALLATION – SENSORS

RUDDER ANGLE SENSOR



Sensor is filled with oil. Do not open!

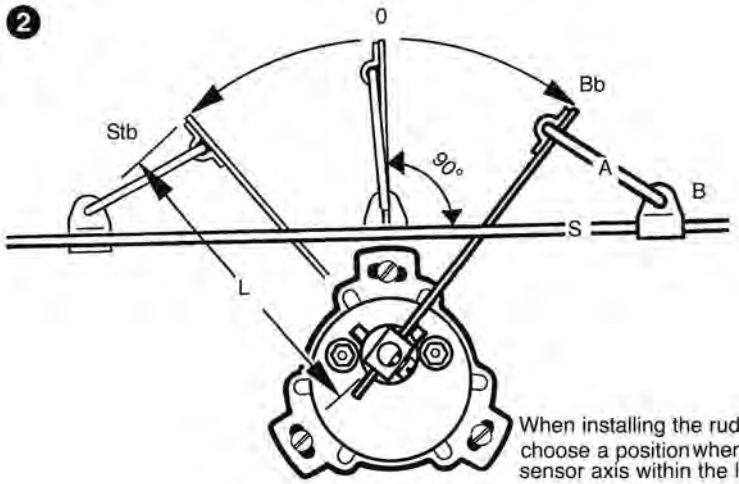
The rudder position sensor should be installed in a favourable position on the rudder segment or on the rope control. When fitting the rudder position sensor to the rudder segment of the hydraulic rudder system, choose a position in which the balance lever - A - (not supplied) is in its zero position (rudder in its centre position), at 90° ±15° from the sensor lever. Make sure that the sensor lever and balance lever have room to swivel freely. The length - L - of the sensor lever is adjustable. If the indicator unit is to give an analogue reading of the rudder's angle position, the sensor lever length - L - has to be equal to the turning radius - R - of the rudder segment. The balance lever A is not supplied.
Bb = Rudder to Port 0 = Rudder in Centre Stb = Rudder to Starboard

SENSOR

Part no.	Description
440-102-001-001D	Single Station
440-102-002-001D	Dual Station

VIEWLINE INSTALLATION – SENSORS

RUDDER ANGLE SENSOR (CONT...)

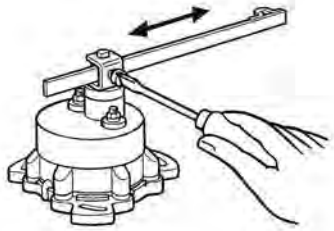


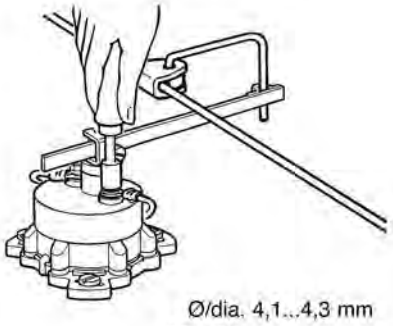
When installing the rudder position sensor on the control rope, choose a position where the control rope passes close to the sensor axis within the lever's turning circle.

Make sure that the sensor lever and balance lever - A - have room to swivel freely. The length L of the sensor lever is adjustable. It depends on the control rope's length of motion and has to be determined. Set the zero position (rudder in its centre position) at right angles to the control rope S. The balance lever A and the connecting piece - B - are not supplied.

Bb = Rudder to Port 0 = Rudder in Centre

Stb = Rudder to Starboard



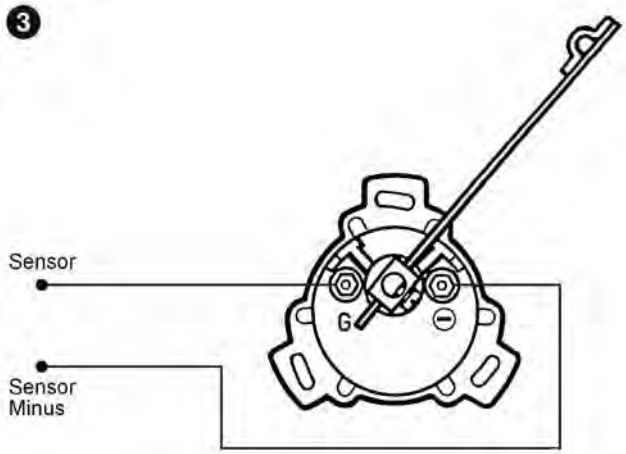


Ø/dia. 4,1...4,3 mm

VIEWLINE INSTALLATION – SENSORS

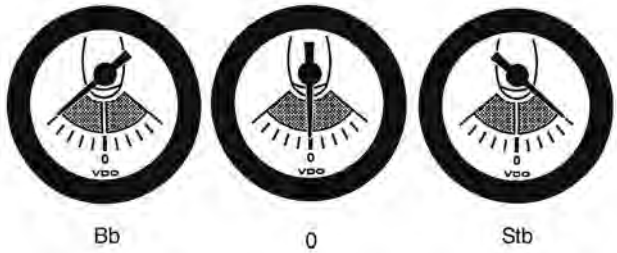
RUDDER ANGLE SENSOR (CONT...)

❸

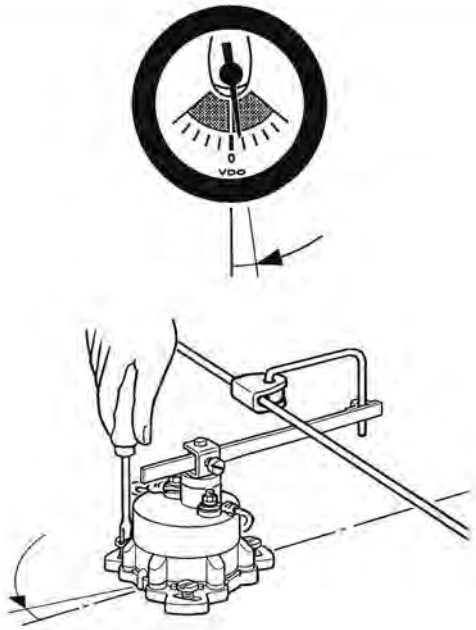


Do not shorten measuring lead.

❹



Bb = Rudder to Port
0 = Rudder in Centre
Stb = Rudder to Starboard



VIEWLINE INSTALLATION – SENSORS

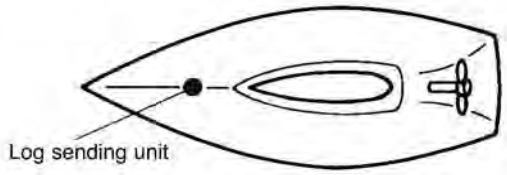
SUMLOG SENSOR

1 Installation of the sending unit

The sending unit must be installed in a turbulence-free zone in the hull. If an echo sounder is installed, the Sumlog sending unit should be installed at the same height and to the side of, or laterally offset to the echosounder. Check for sufficient distance to stanchions, stringers, bulkheads, etc. when drilling the hull.

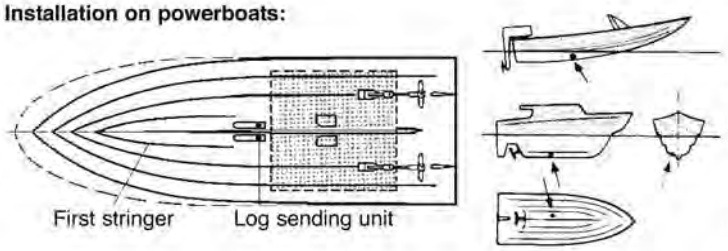
Do not install the sending unit close to external valves, anodes, etc. to avoid influences by turbulence.

2 Installation on sailing boats:

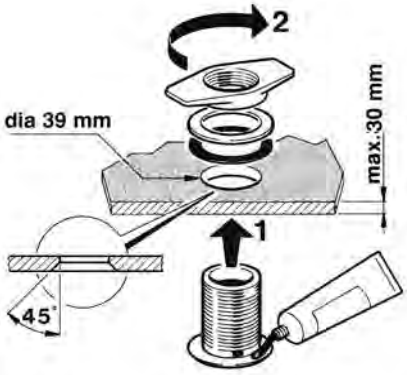


On sailing boats the sending unit should always be installed in front of the keel, as close to the longitudinal ship axis as possible. On boats with a long keel the installation should be at the end of the first third of the hull, but not at the widest location of the hull.

Installation on powerboats:



On powerboats the sending unit should be installed at about the first third of the hull and never towards the stern in a zone of strong turbulence or up front, where strong disturbances by air induction must be expected. An ideal installation is near the longitudinal axis of the ship and in the zone of the first stringer, directly in front of the engine compartment if possible. At higher speeds this is the only location where a disturbancefree operation can be expected..



Make a hole 39 mm dia., at a suitable location. The wall thickness can be up to 30 mm. Camber the hole out at 45 degrees for good sealant distribution during the assembly. To install the hull sleeve and the sending unit proceed as follows:

1. Put salt-water resistant sealant on the hull sleeve flange and introduce the sleeve from the outside into the hole.
2. From the inside, install the black sealing ring on the hull sleeve, then the white one, and screw the fixation nut down.
   Lightly hand-tighten the fixation nut at first. After letting the sealant harden, tighten the nut another ¼ turn by hand and check the hull feedthrough for leaks.
3. Put the loop of the control rope around the hull sleeve and knot the loose end of the rope to the blind plug.
4. Screw the flood valve to the hull sleeve until an audible click indicates secure seating, is heard.
5. Insert the sending unit from the top and secure it with the nut.

Install flooding valve and sending unit:

Note the correct direction when inserting the sending unit. The pointed side of the sending unit loop must be directed towards the bow as soon as the sending unit has been inserted.

VIEWLINE INSTALLATION – SENSORS

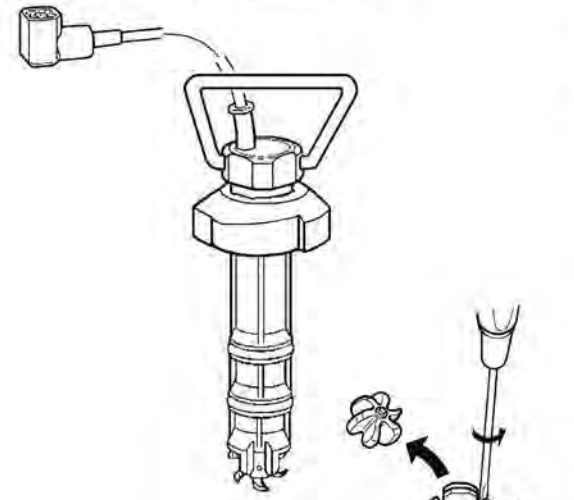
SUMLOG SENSOR (CONT...)

3 Removal of the sending unit

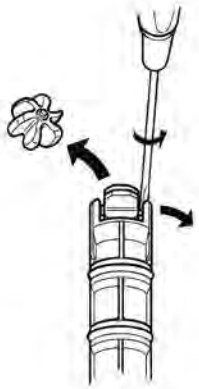
Loosen the union nut and pull the sending unit from the sleeve by rotating it slightly. Immediately insert the blind plug.

Never pull on the cable to remove the sending unit. Always use the loop.
Always insert the blind plug when the sending unit has been removed

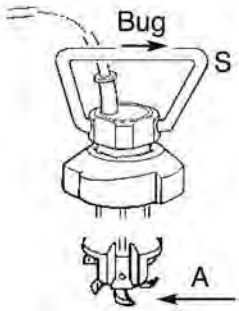
4 Replacement of the paddle wheel



The paddle wheel of the sending unit is rotated by the flow of water. The rotational speed of the paddle wheel is measured without contacts, and transmitted to the indicating instrument.



Use a screwdriver to replace the paddle wheel and its shaft.
Carefully lift the paddle wheel shaft upwards to remove it from the sending unit.
Insert the new shaft into the new paddle wheel and install shaft and wheel, again using the screwdriver.



Check the correct installation direction when replacing the paddle wheel. The spoon-shaped leading surface of the wheel (A) must be directed towards the pointed side of the loop (S).

The pointed side of the loop must be directed to the bow when the sending unit is inserted in the hull sleeve.

Paddle wheel for indicating range 12 (kn, km/h, mph)

Paddle wheel for indicating range 30 and 50 (kn, km/h, mph)

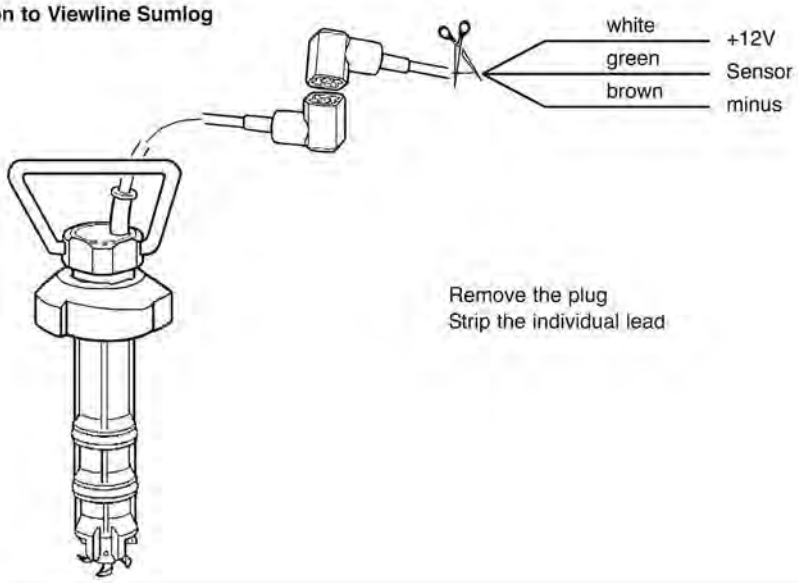
SENDER (TRIDUCER)

Part no.	Description
X11-719-000-053	Transom Mount
X11-719-000-058	Hull Mount

VIEWLINE INSTALLATION – SENSORS

SUMLOG SENSOR (CONT...)

5 **Connection to Viewline Sumlog**



5 **Calibration**

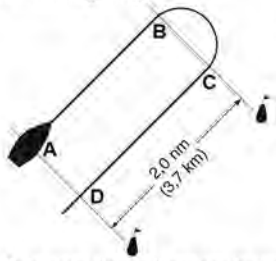
After installation of the system your Viewline Sumlog must be calibrated to obtain speed and distance measurements with the maximum accuracy.
On the Viewline Sumlog display, select the FREQUE setting for the die INPUT function.

On the Viewline display, depending on the impeller being used, set the PULSE value to one of the following pulse numbers:

12 kn: 54737 Imp/nm
50 kn: 41748 Imp/nm
60 mph: 41748 Imp/nm

Mark two distinct points on the map. The distance between these two points defines the measuring length. During the trip from one point to the other, the Viewline Sumlog measures the covered distance. In flowing waters it is necessary to make the measuring run in both directions to compensate for the influence of the current.

Measuring length:



Make a measuring run at a cruising speed, which remains as constant as possible.
Check that the trip distance counter is set to zero.

The following example refers to a measuring run in water without a current with a measuring length of 2 nautical miles (nm).
Approach starting point A of the measuring length.
Set the trip distance counter to zero when passing starting point A. T 00

Follow the measuring length on a straight line and note the indicated value (1.7 nm in this example) when passing end point B. T 17

Calculate the calibration factor C with the following formula:

$$C = \frac{\text{Effectively covered distance (A-B)}}{\text{Indication of the display (A-B)}} = \frac{2{,}0\ \text{nm}}{1{,}7\ \text{nm}} = 1{,}18$$

Multiply the calculated value C by the pulse number set on the Viewline display and set the calculated result as the new pulse number.
In the case of a measuring run in flowing water repeat the same distance measuring steps in the opposite direction (measuring length C-D).
The calibration factor is calculated with the following formula:

$$C = \frac{\text{Effectively covered distance (A-B) + (C-D)}}{\text{Indication of the display (A-B) + (C-D)}}$$

⚠ Do not use the GPS navigator as a reference for Viewline Sumlog calibration. The GPS Navigator indicates speed over ground (SOG), but the Viewline Sumlog measures speed through water.

PARTS LISTING –
ACCESSORIES

The Accessories section comprises of all accessories required as additional add-ons to complement and complete the range of VDO Cockpit International and Viewline All-Weather instruments.

The large assortment of components including Bezels, Clamp Rings, Globes and -holders, Windscreen Washer Systems Accessories and more, gives you a full rounded selected to complement most needs.

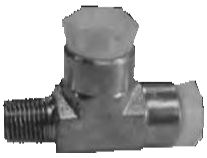
ADAPTORS – EXTENSION PIPE

ADAPTORS – BRASS

Suitable for pressure & temperature senders & switches with 1/8”-27NPTF thread. Mechanical temperature gauges with 1/8”-27NPTF, oil pressure pipe kits for mechanical pressure gauges.

Part no.	Internal Thread	External Thread
105-040	1/8”-27NPTF	1/4”-18NPTF
105-042	1/8”-27NPTF	3/8”-18NPTF
105-041	1/8”-27NPTF	5/8”-18UNF
105-043	1/8”-27NPTF	1/2”-14NPTF
105-029	1/8”-27NPTF	M14X1.5
105-035	1/8”-27NPTF	M16X1.5
105-039	1/8”-27NPTF	M18X1.5

Part no.	Internal Thread	External Thread
105-031	M14X1.5	M16X1.5
105-032	M14X1.5	M18X1.5
105-033	M14X1.5	5/8”-18UNF
105-034	M14X1.5	3/8”-18NPTF
105-036	M14X1.5	1/2”-14NPTF



T-PIECE ADAPTER (STEEL)

Part no.	Description
1403060	2 x 1/8”-27NPTF Female 2x1/8”27NPTF1xMale

PRESSURE SENDER ADAPTOR

Part no.	Description
415-030	2xM14x1.5 1xM10x1

EXTENSION ADAPTOR

Part no.	Description
415-032	Male/Female 1/8”-27NPTF

PRESSURE SENDER EXTENSION PIPE

Part no.	Description
410-541	300mm

BEZELS – BRACKETS

BEZELS - VIEWLINE

Part no.	52MM
A2C53186040	Flat black
A2C53186027	Round black
A2C53186029	Round chrome
A2C53186028	Round white
A2C53186024	Triangle black
A2C53186026	Triangle chrome

Part no.	85MM
A2C53192911	Flat black
A2C53192913	Round black
A2C53192914	Round chrome
A2C53192916	Round white
A2C53192917	Triangle black
A2C53192918	Triangle chrome

Part no.	110MM
A2C53210745	Flat black
A2C53210749	Round black
A2C53210761	Round chrome
A2C53210760	Round white
A2C53210763	Triangle black
A2C53210765	Triangle chrome

BRACKETS – INSTRUMENTS

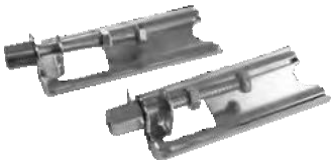
Suitable for all 52mm instruments

Part no.	Description
230-005	1x52mm
230-006	2x52mm
230-007	3x52mm

CLAMPS – CONNECTORS – GLOBES

CLAMP RINGS & SIDE BRACKETS

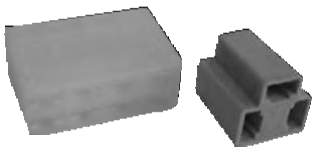
Part no.	Description
800-005-015G	Spin lock clamp for 52mm instruments
800-005-005G	Spin lock clamp for 80mm instruments
800-005-007G	Spin lock clamp for 100mm instruments
800-005-001G	Side Bracket kit for 80-100mm instruments



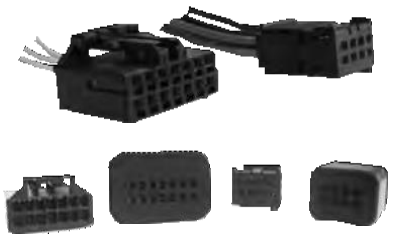
SUITABLE FOR VIEWLINE RANGE OF INSTRUMENTS

Part no.	Description
A2C53007398	Spin lock clamp for 52mm instruments
A2C53212238	Spin lock clamp for 85mm instruments
A2C5323888	Spin lock clamp for 110mm instruments

CONNECTORS



Part no.	Description
999-115-015	3 way
Z863101	4 way
Z863102	6 way
Z863103	8 way
Z863016	Terminal



Part no.	Description
A2C59510851	Connector kit 14 pin
A2C59510850	Connector kit 8 pin
A2C-8 Way	Connector harness 8 way
A2C-14 Way	Connector harness 14 way
A2C53324671	Connector protective cap 8 way
A2C53324664	Connector protective cap 14 way

GLOBES

Part no.	Description
999-065-001	Globe Wedge large 12V 3W
999-065-002	Globe Wedge large 24V 3W

GLOBES – INSTRUMENT BLANK – REDUCTION RINGS

GLOBE HOLDERS

Part no.	Description
29-133-005	Insulated for 7mm base globe
29-133-009	Metal Single Spade 7mm base globe
999-067-001	Wedge large globe holder
800-005-002G	Insulated Large wedge globe 12V (pair)
800-005-003G	Insulated Large wedge globe 24V (pair)

INSTRUMENT BLANK – PLASTIC BLACK

Suitable for 52mm cut-out.

Part no.	Description
230-038	Instrument Blank – Plastic Black

REDUCTION RINGS – METAL BLACK

Used for mounting 52 mm instruments in 60mm cut-outs.

Part no.	Description
14-067-014-5162	Reduction Rings – Metal Black

RESISTOR (DROPPING) - FOR VIEWLINE

Dropping resistor 24V w/o connector

Part no.	Description
A2C59510221	Resistor (Dropping)

WARNING BUZZERS

WARNING BUZZERS

The VDO warning buzzer signals critical temperature or pressure variations. It is activated by a switch or sender unit with warning contact.

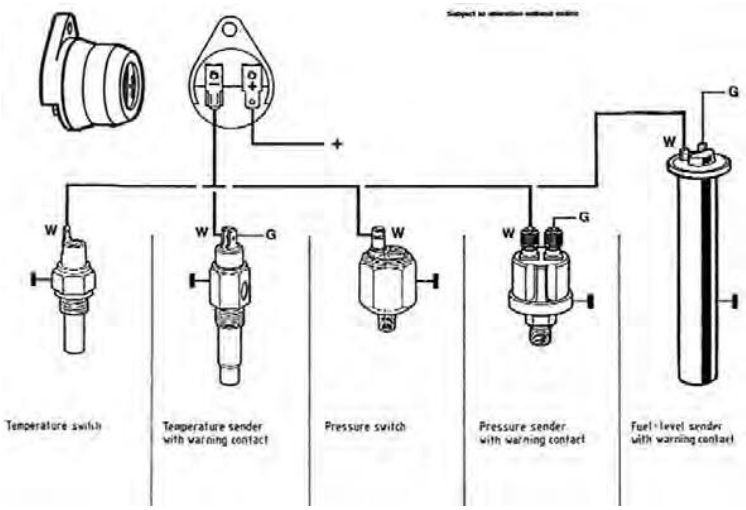
- 38mm diameter
- 34mm depth
- Connection 2x4 amp terminals
- Dash Mount

Part no.	Range	Colour	Voltage (V)
X10-236-000-002C	85dB	Black	12
X10-236-000-003	85dB	Red	24

- 41.8mm diameter
- 22mm depth

Part no.	Range	Colour	Voltage (V)
415-006	89dB	Black	3-30

WARNING BUZZER INSTALLATION



WINDSCREEN WASHER SYSTEMS

WINDSCREEN WASHER SYSTEMS

WASHER SYSTEM - 4.0 LITRE

Part no.	Description	Voltage (V)
X10-246-001-012	Kit	12
X10-246-001-013	Kit	24

12V pump: +2.2 bar
24V pump: +1.8 bar

Bottles are made of all-weather and age resistant material to withstand temperatures from -30ºC to +100ºC

Please note: Nozzle, Non Return Valve, Hose, Push Button and T-Piece must be ordered separately.

Please see page 136

WASHER SYSTEM - 6.0 LITRE

Part no.	Description	Voltage (V)
X10-246-001-015	Kit	12
X10-246-001-016	Kit	24

12V pump: +2.2 bar
24V pump: +1.8 bar

Bottles are made of all-weather and age resistant material to withstand temperatures from -30ºC to +100ºC

Please note: Nozzle, Non Return Valve, Hose, Push Button and T-Piece must be ordered separately.

Please see page 136

WINDSCREEN WASHER SYSTEMS - ACCESSORIES

HOSE

Part no.	Description
41-037	Hose

NON-RETURN VALVE

Part no.	Description
246-063-012-001G	Non-Return Valve

NOZZLE

Part no.	Description
246-069-006-006G	Twin chrome nozzle
246-069-056-001Z	Twin large clip on nozzle
246-069-029-004G	Twin plastic nozzle
246-069-050-005D	Twin small clip-on nozzle

PUMP - MONO

Part no.	Pressure	Consumption	Flow (L/min)
246-082-008-014C	2.2 Bar 12V	max = 4.5amp	2.0
246-082-008-012C	1.8 Bar 24V	max = 1.2amp	1.0

PUMP - UNIVERSAL

Part no.	Description
246-075-010-001C	24
246-075-015-001C	12

WINDSCREEN WASHER SYSTEMS - ACCESSORIES (CONT...)

PUSH BUTTON

Part no.	Description
90-006-001	Push Button

T-PIECE

Part no.	Description
88-326-004	Push Button

WIRING HARNESS

Part no.	Description
X39-246-000-001	Wiring Harness

PARTS LISTING –
CONTROL & MONITORING SYSTEMS

The Autosave product line from Torre Parts and Components is Designed to control and monitor a fleet of vehicles, be it petrol, diesel, or medium to heavy duty vehicles.

The Autosave system is a monitoring system which will provide the driver an early warning signal thus saving the vehicle from any potential damage.

The system is designed to save fuel, reduce down time, increase productivity, manage driver performance and improve vehicle safety just to mention a few.

BENEFITS OF CONTROL & MONITORING SYSTEMS

SAVE FUEL

With the price of fuel escalating exponentially over the past 5 years, this has got to be high on the list of priorities when it comes to fleet management. By installing the Revs, Speed and Idle Limiting System, fuel costs can be slashed because the driver of the vehicle will not be able to speed or over-rev, which will lead to great fuel saving.

REDUCE DOWN TIME

Any vehicle out of action is a waste of time and money which no business or individual needs or can afford.
The Autosave range is pro-active in that it warns you to take action BEFORE the damage is done! You can save yourself a blown engine or even the loss of an entire vehicle due to an engine failure.

INCREASE PRODUCTIVITY

Keep your vehicle working for you and running effectively. Vehicle downtime reduces productivity and adds expense.

MANAGE YOUR VEHICLE PRO-ACTIVELY

If you are monitoring all the vital signs of your vehicles and taking appropriate action, the chances of engine damage occurring are eliminated, and so are the potential costs of engine repair. It's like having your own fleet manager for each vehicle - anticipating problems and avoiding them before they happen.

MANAGE DRIVER PERFORMANCE

Prevent speeding, resultant fines and bad driving habits such as over-revving and excessive engine idling time.
Don't pay the price for a driver who ignores the warning lights on the dashboard.

SAVE TIME AND MONEY

Reduce vehicle maintenance costs and keep your vehicles on the road. Extend the life of your vehicles and engines and reduce the number of accidents by limiting driving speed. Prevent "ghost" trips from occurring with a device which measures tyre revolutions, independently of the odemeter.

REDUCE CO_2 EMISSIONS AND SAVE ENERGY

By limiting the idling time on your vehicle engine, and preventing excessive revving, you will reduce exhaust emissions significantly, thus reducing CO_2 emissions and saving energy.

IMPROVE VEHICLE SAFETY

With an Autosave reversing camera installed on your vehicle you can do away with vehicle and pedestrian accidents caused during reversing when the driver cannot see clearly behind him.

FREQUENTLY ASKED QUESTIONS

AUTOMONITOR

1. WHICH VEHICLES CAN BE FITTED WITH AUTOMONITOR?

Almost any vehicle can be fitted with the Automonitor. However, it is more suited to commercial vehicle applications such as trucks, buses, bakkies, and machinery used in the agricultural, construction, mining & farming industries.

2. WHY DOES THE AUTOMONITOR ONLY MONITOR OIL PRESSURE, COOLANT LEVEL AND COOLANT TEMPERATURE?

These are the three most critical parameters on a vehicle/machine.

3. ON AIR-COOLED ENGINES, HOW DO YOU MONITOR THE ENGINE TEMPERATURE?

For an air-cooled engine, a sender measures the temperature of the cylinder head.

R.S.I.

1. WHAT DOES R.S.I. STAND FOR?

Revs (engine revolutions - rpm), Speed (Road Speed km/h), & Idling (engine idling).

2. WHAT DOES R.S.I. DO?

The R.S.I. limits the engine revolutions to prevent engine damage & to reduce dangerous excessive speeding. Additionally, it also limits the idling to 5 minutes, then the engine automatically switches off.

3. WHY 5 MINUTES FOR IDLING?

Most vehicle manufacturers recommend that the engines idle for no more than 5 minutes.

R.S.L.

1. DOES THE R.S.L. REDUCE ENGINE POWER?

The R.S.L. limits the road speed. It does not reduce or limit the engines' power.

2. WHY IS THERE A SEPARATE CONTROL MODULE FOR PETROL & DIESEL ENGINES?

The two engines have different ways of igniting fuel. As a result there is also a difference in the way that the engines are shut down. For that reason there are separate modules for the 2 engine types.

3. WHAT DO THE CALIBRATOR & THE POLICING UNITS DO?

The Calibrator unit is used to pre-set the speed limit on the control module. The Policing unit is used to check if the speed limit set on the control module has been changed or tampered with.

FREQUENTLY ASKED QUESTIONS (CONT...)

RPM ALERT

1. IS THE RPM ALERT ONLY USED TO MONITOR EXCESSIVE ENGINE REVOLUTIONS?

No, it can also be used to monitor road speed and will warn the driver if either revs or speed go over the preset limit.

TURBO TIMER

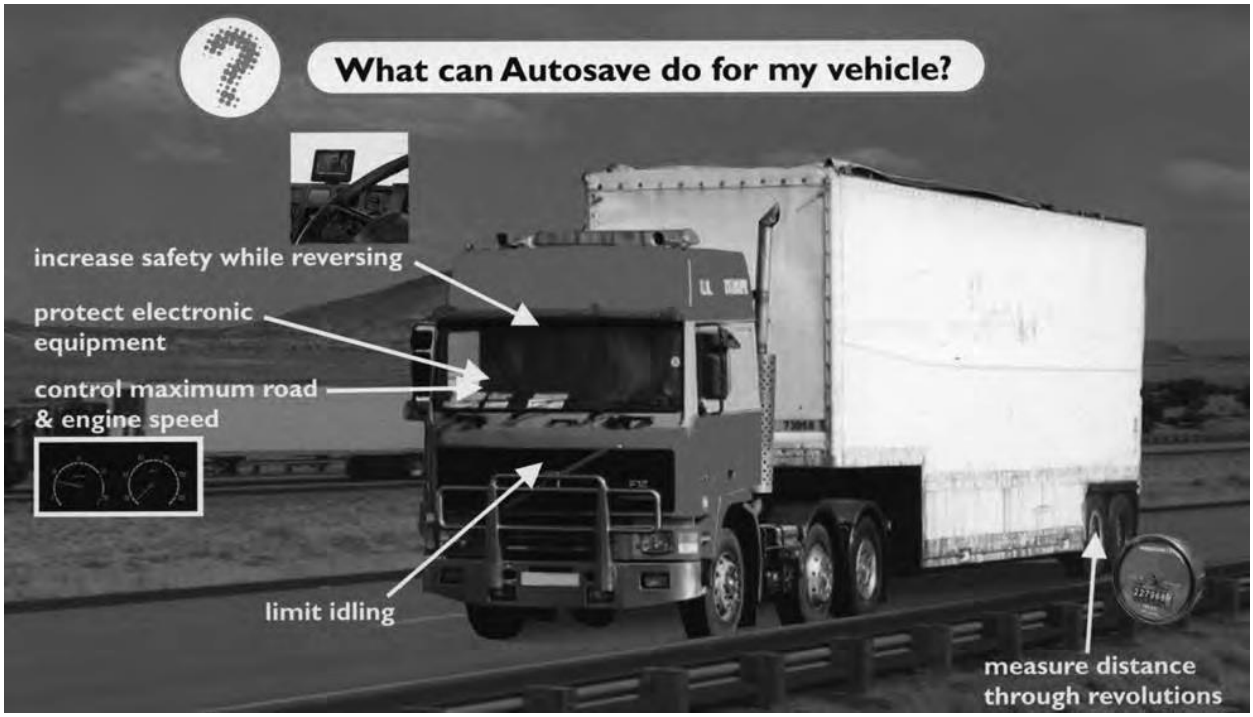
1. DOES THE TURBO TIMER LUBRICATE THE TURBO?

The Turbo Timer does not lubricate the turbo. It prevents damage to the turbo by allowing the vehicle to run at idle speed for the recommended 2 minutes before shutting down.

TILT SWITCH

1. WHAT IS THE PURPOSE OF THE TILT SWITCH?

The Tilt Switch is used to prevent damage to the engine by shutting it down in the unfortunate event of the vehicle overturning. In this situation the engine is no longer lubricated, so as a protection against further damage, the Tilt Switch shuts the vehicle down.



AUTOMONITOR

AUTOMONITOR

The Automonitor is a PRO-ACTIVE engine monitoring system which provides an early warning of potential malfunctions resulting from low oil pressure, high water temperature and low cooling water level.

The malfunctions are indicated to the driver on a display unit and by means of a buzzer located in the truck cabin. Optionally, a shutdown of the vehicle can be triggered on fault detection.

The Automonitor can be combined with an RSI(Rev, Speed & Idling) to provide a complete pro-active system.

FEATURES:

- Self diagnostic test mode
- Optional shut down mode on fault mode output
- Audible warning
- Visual operating display
- Fail safe sender units
- Shock and vibration-resistant module
- Water & dust proof control module
- Upgradable to include RSI

APPLICATION:

Commercial vehicles, diesel and petrol engines.

Part no.	Description
415-SPEC-501	Installation kit 12V
415-SPEC-502	Installation kit 24V

Complete Installation kit comprising of:
electronic module-display-wiring harness-buzzer, switches and all parts for diesel shutdown.

Part no.	Description
415-SPEC-601	Kit all level probes

This kit does not include the water level probe or the diesel shutdown components.

Suitable probe part no's: **415-207, 415-148, 230-058**

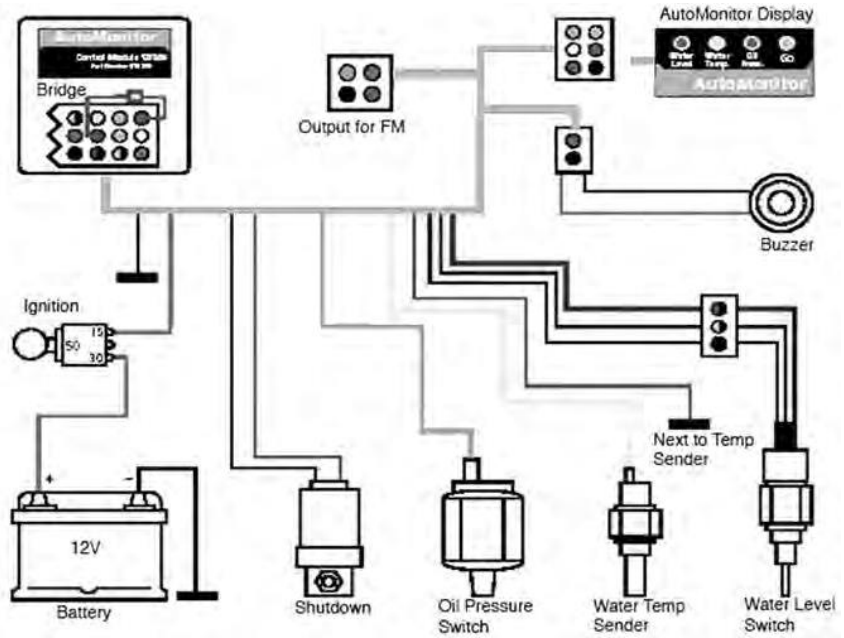
Part no.	Description
415-SPEC-503	Basic Kit 24V

Complete installation kit comprising all installation parts except diesel shutdown components

AUTOMONITOR (CONT...)

AUTOMONITOR (CONT...)

DIAGRAM SHOWING AUTOMONITOR CONNECTIONS



AUTOMONITOR - AIR COOLED ENGINE

AUTOMONITOR - AIR COOLED ENGINE

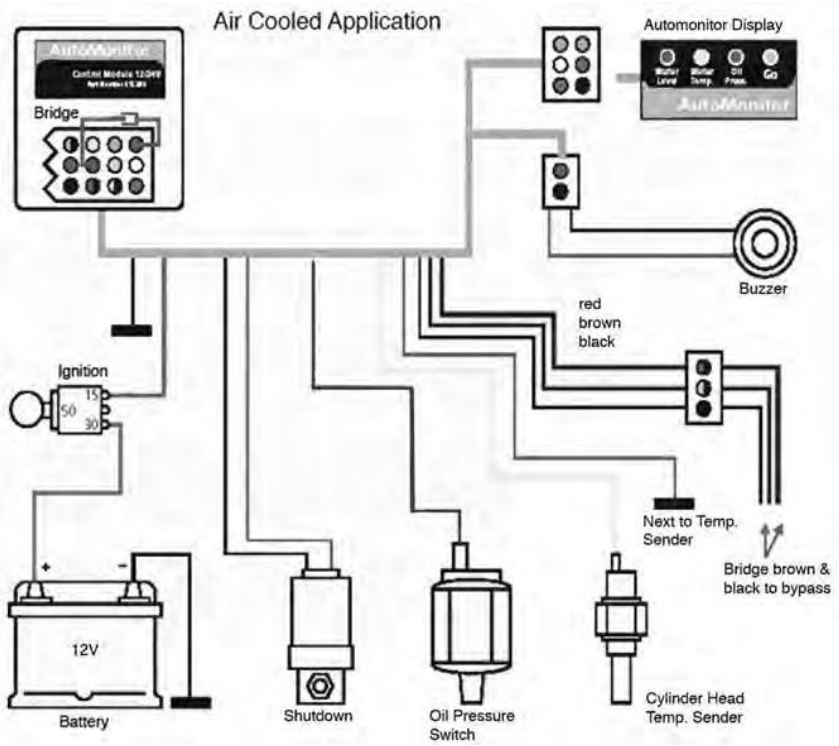
FUNCTION:

Detects the following:

- Engine Oil Pressure
- Engine Air Cooled Temperature (170ºC)

Part no.	Description
415-SPEC-303	Installation kit 12V
415-SPEC-304	Installation kit 24V

DIAGRAM SHOWING AUTOMONITOR CONNECTIONS



AUTOMONITOR & REVS, SPEED & IDLING LIMITER

AUTOMONITOR

The Automonitor is a PRO-ACTIVE engine monitoring system which provides an early warning of potential malfunctions resulting from low oil pressure, high water temperature and low cooling water level.

The following Automonitor Kits will accept the RSI add on kit.

Part no.	Description
415-SPEC-501	Automonitor Kit
415-SPEC-502	Automonitor Kit
415-SPEC-601	Automonitor Kit
415-SPEC-503	Automonitor Kit

For more information on these kits please see page 143.

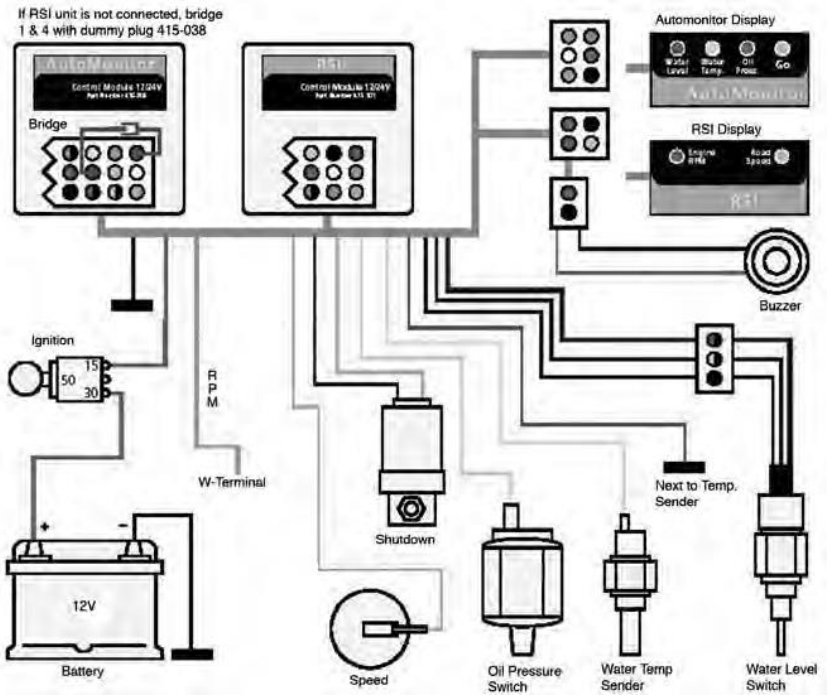
RSI SYSTEM (ADD-ON KIT)

The RSI system limits engine revolutions, vehicle speed and idling time on vehicles and prevents these operating limits from being exceeded. Revolutions and speed are controlled by means of an early warning visual display, a buzzer alarm and an optional engine shut down.

Part no.	Description
415-SPEC-402	Installation kit 12/24V

This kit is designed to be added to the Automonitor system. Monitoring speed-RPM and idling. The Automonitor harness is designed to accept the RSI module and display. The system requires a Road Speed Pulse and engine RPM input signal.

DIAGRAM SHOWING AUTOMONITOR AND RSI CONNECTIONS



AUTOMONITOR & REVS, SPEED & IDLING LIMITER (CONT...)

RSI SYSTEM (STAND ALONE)

Not recommended for petrol engine application.

This kit comprises RSI module-display-buzzer-plug kit-harness. The system requires a Road Speed Pulse and Engine RPM input signal.

Diesel Shutdown components are not included in this kit.

APPLICATION:

Diesel engine applications only!

Part no.	Description
415-SPEC-403	Installation Kit 12/24V

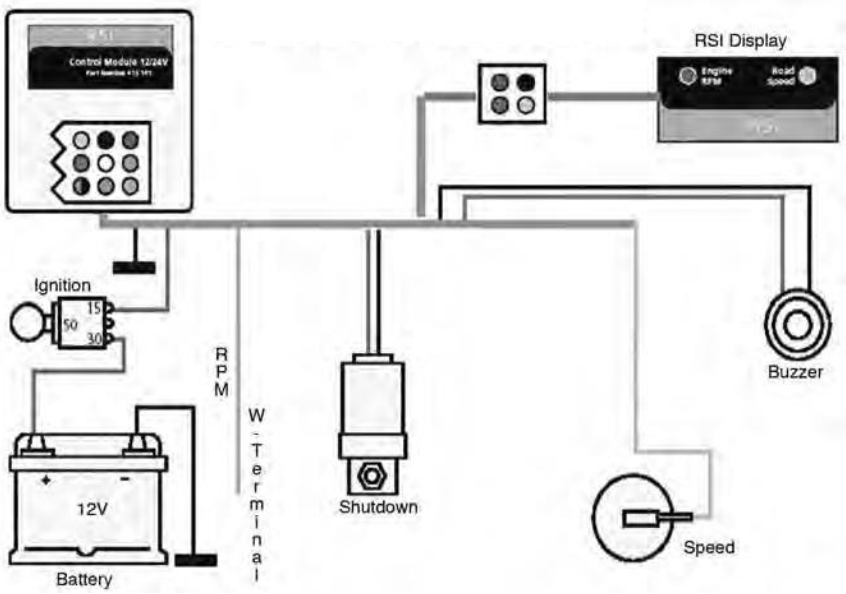
For more information on these kits please see page 143.

BUZZER

- 41.8mm diameter
- 22mm depth

Part no.	Description	Colour	Voltage (V)
415-006	89dB	Black	3-30

DIAGRAM SHOWING RSL CONNECTIONS



WATER LEVEL PROBE

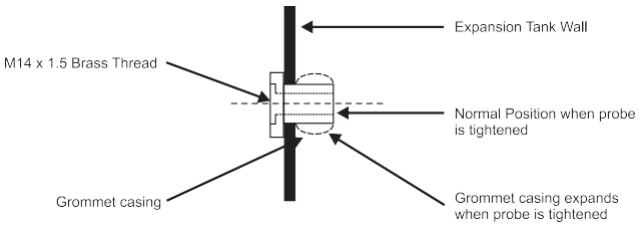
WATER LEVEL PROBE

MOUNTING THE RUBBER GROMMET IN THE EXPANSION TANK

- Find a suitable location (slightly below the low level mark on a flat surface).
- The probe should never be installed in an area of cooling water turbulence.
- Drill a hole of 24mm diameter using a hole saw (a cone drill is not suitable).
- Remove/clean holes of burrs & sharp edges.
- Use an adhesive to stop the grommet from turning inside the hole.
- Use grease or a mild lubricating oil between the flat surface of the grommet and the hexagon of the probe for easier turning.
- Tighten the probe by hand in the grommet until it is properly secured (if necessary turn it another 1/2 turn using a spanner).

Part no.	Description
415-207	Water Level Probe (Capacitive)
415-209	Interface for above
415-SPEC-215	Kit - Includes Probe & Interface
395-209	Water Level Probe (Compact) (No Interface required)
395-210	Oil Level Probe (Compact) (No Interface required)
1403057	Water Level Sensor Grommet
1403057-A	Water Level Sensor Brass Flange

Grommet no: **1403057**



Brass Flange no: **1403057-A**

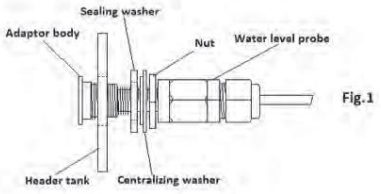


Fig.1

Carefully bend the sealing washer sufficiently to allow it to be passed through the 25 mm hole in the header tank.

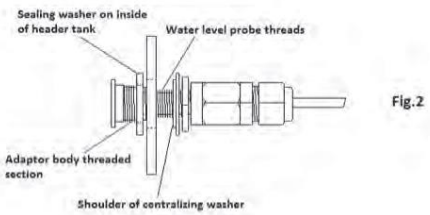


Fig.2

Pull the sealing washer over the threaded section of the adaptor body using the water level probe. Slide the centralizing washer shoulder into the header tank hole. Holding this position, turn the nut onto the adaptor body until finger tight.
Do not allow the adaptor body to rotate on the water level probe threads.

FITMENT INSTRUCTION

Coolant Sensor Adaptor

Select a suitable position for the level sensor in the vehicles header tank.
Ensure that there is sufficient depth for the probe.
Drill a 25mm hole. Clean the hole thoroughly removing any sharp edges on the inside. Do not increase the diameter of the hole.
As shown below, using a water level probe, assemble the Nut, Centralising Washer and Sealing Washer over the threaded section and screw the centre portion of the sensor adaptor onto the probe making 2 complete turns.

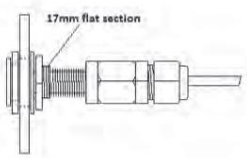
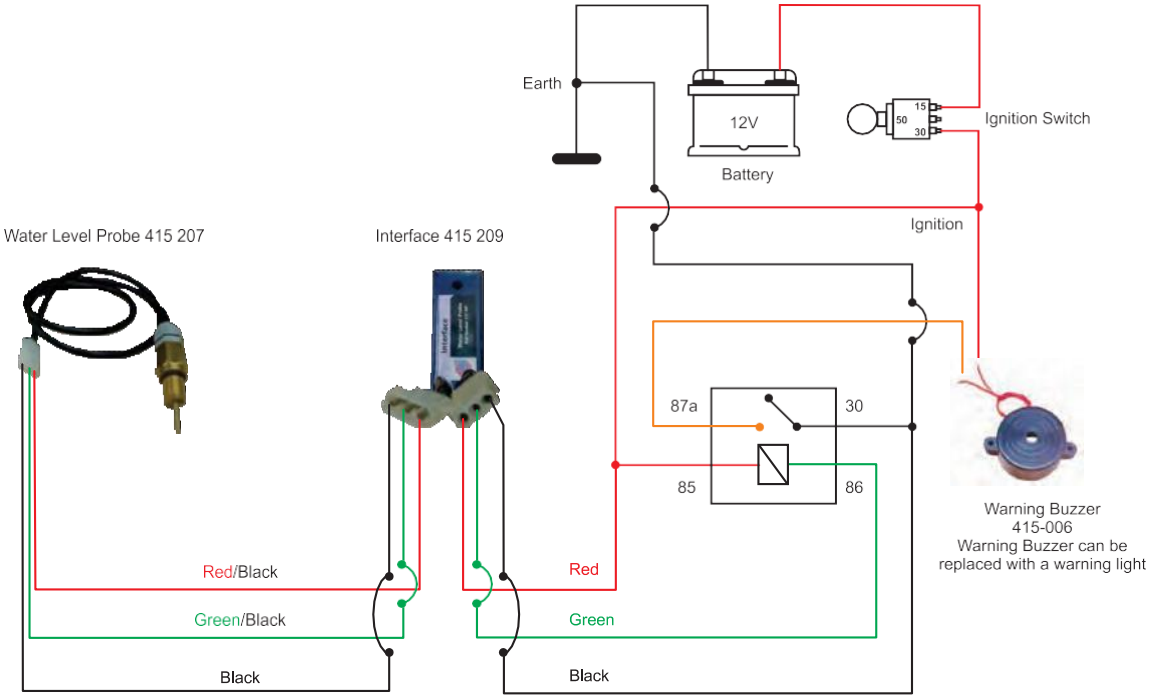
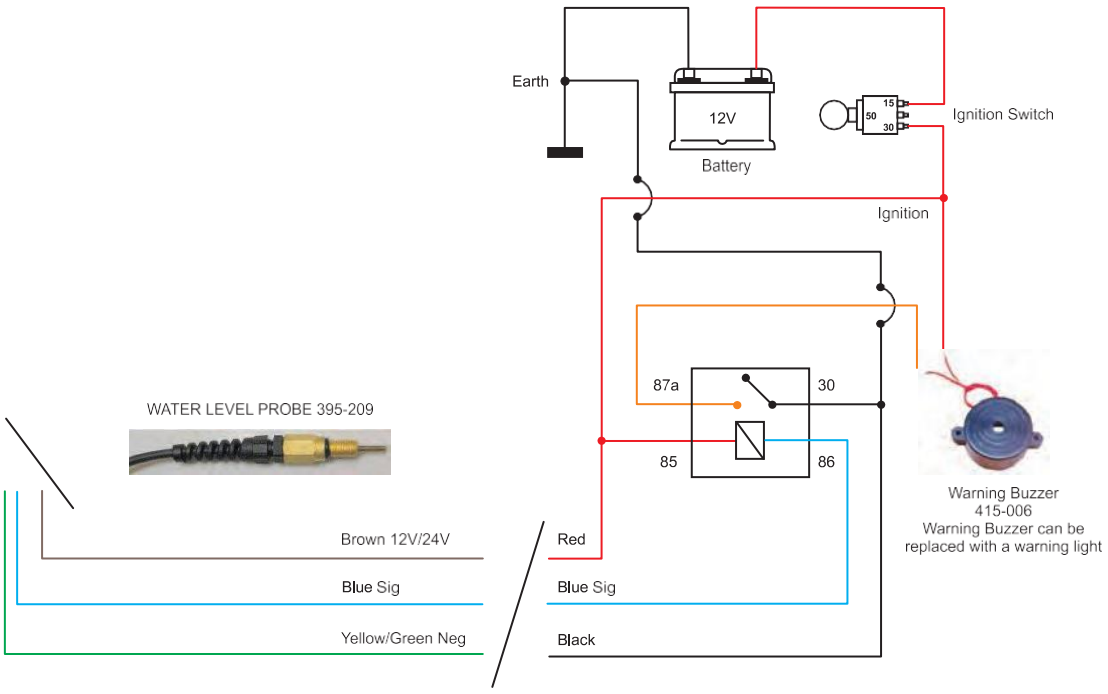


Fig.3

Using a 27mm open ended spanner,tighten the nut sufficiently to ensure a good water seal. Use a 17mm open ended spanner on the flats of the adaptor body to prevent it from turning.

WATER LEVEL PROBE (CONT...)





ROAD SPEED LIMITER

ROAD SPEED LIMITER - PETROL

The Road Speed Limiter controls vehicle speed by limiting it to a preset speed. It does not restrict the vehicle's performance until the preset limit is reached when an audible warning sounds. If the warning is ignored, the vehicle is permitted to travel marginally faster before its speed is limited. Once the vehicle speed drops below the limit, control is returned to the driver.

FEATURES:

- Limits speed without limiting revs.
- Allows maximum pulling power.
- Audible warning speed threshold.
- Robust and tamper proof.
- Programmable speed range.
- Self Diagnostic fault memory.
- High accuracy tolerance (0.5%).
- Ability to check the total installation while the vehicle is stationary.

BENEFITS:

- Pro-Active control of speed.
- Safer drivers.
- Lower collision costs.
- Less fuel.
- Less engine repairs.
- Less downtime.
- Less maintenance.
- Less traffic fines.

Our product has been approved by the governments of: Zambia, Tanzania, Kenya, Zimbabwe, Namibia, Uganda and Zambia.

APPLICATION:

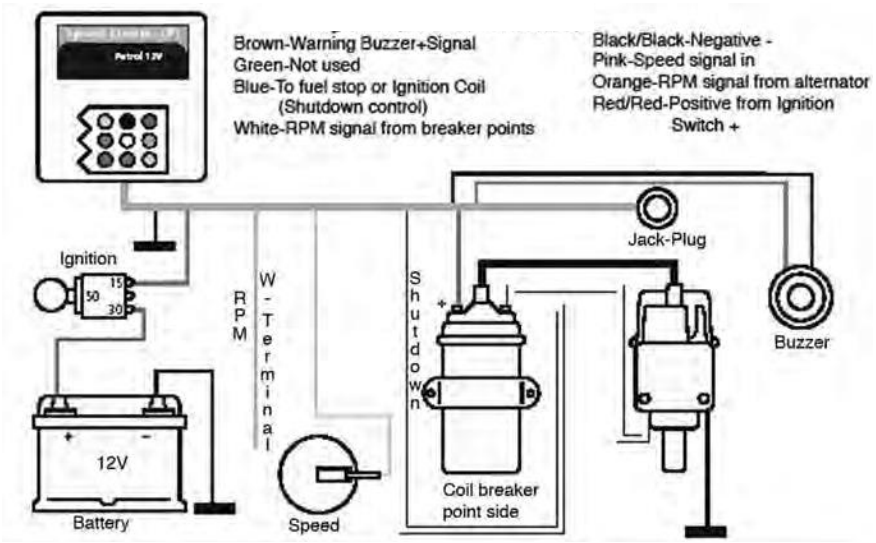
All petrol engines.

Part no.	Description
104-SPEC-101	Complete Kit Petrol 12V

Includes electronic module-wiring harness, Buzzer and speed sensor kit

Part no.	Description
104-SPEC-104	Installation Kit Petrol 12V without Speed Sensor Kit

DIAGRAM (PETROL VEHICLES)



ROAD SPEED LIMITER (CONT...)

ROAD SPEED LIMITER - DIESEL

Part no.	Description
104-SPEC-102	Full Kit Diesel 24V
104-SPEC-105	Full Kit Diesel 12V

WITHOUT the speed input sender.
The speed signal can be taken from an electronic speedometer or tachograph

Part no.	Description
104-SPEC-103	Complete Kit Diesel 24V
104-SPEC-106	Complete Kit Diesel 12V

INCLUDES the Speed Sensor and diesel shutdown components

Part no.	Description
104-SPEC-201	Basic Kit Diesel 24V

INCLUDES the Speed Sensor but **WITHOUT** diesel shutdown components

Part no.	Description
104-SPEC-201K	Basic Kit Diesel 12/24V

INCLUDES the Speed Sensor but **WITHOUT** diesel shutdown components
(no RPM input required)

Part no.	Description
104-SPEC-107K	Kit Diesel 12/24V

INCLUDES the Module/Harness and buzzer (no RPM input required)

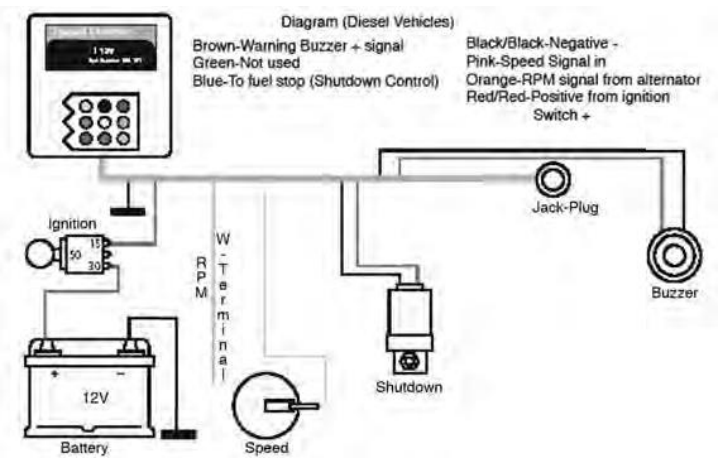
Part no.	Description
104-SPEC-107	Kit Diesel 12/24V

INCLUDES the Module/Harness and buzzer

APPLICATION:

All types of diesel engines

DIAGRAM (DIESEL VEHICLES)



SPEED RPM ALERT

SPEED/RPM ALERT

This is a warning device which alerts the driver to over-revving or excessive speed. It does not limit revs or speed as such but alerts the driver to the infringement by means of a warning light or warning buzzer.

FEATURES:

- It has a passive warning device.
- Easily adjustable setting.
- Over-ride at any time for safety reasons.
- Can be used on any vehicle.

APPLICATION:

All types of vehicles, petrol or diesel.

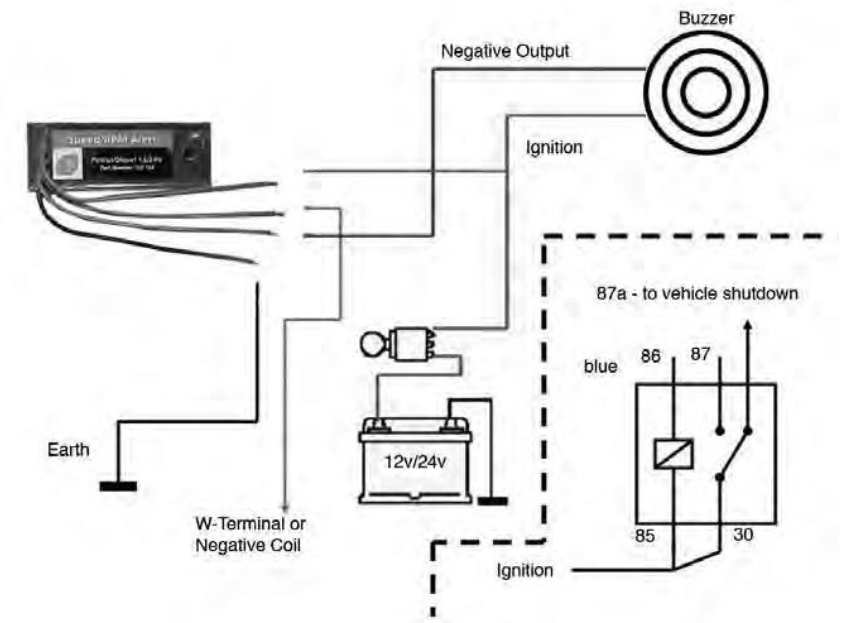
Part no.	Description
104154	Module only

Depending on the application a buzzer or warning light must also be supplied.

The speed input signal can be taken from an existing electronic Speedometer or from an in-line speed sender (not supplied with module).

The RPM signal is to be taken from the “W” terminal of the alternator.

DIAGRAM SHOWING SPEED/RPM ALERT CONNECTIONS



REV LIMITER

SPEED/RPM ALERT

Engine revolutions, if not kept under manufacturers' specification, can irreparably damage an engine. Stop the driver from over revving. When the revs exceed the preset speed limit, it gives an audible and visible warning signal. Thereafter there is an optional engine shut-down.

SPECIFICATIONS:

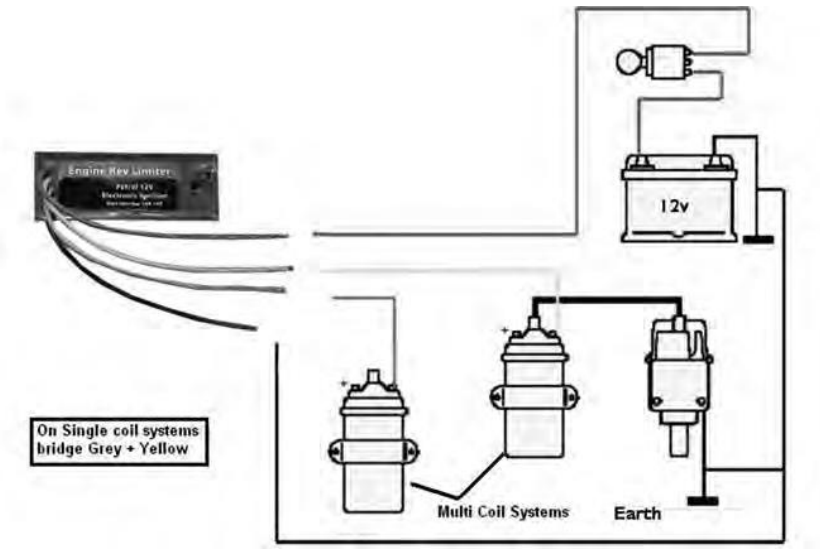
- 12V application
- Temperature range: -40ºC to +85ºC
- Adjustable range: 4 cyl. 3000 rpm to 12000 rpm
  6 cyl. 2000 rpm to 9000 rpm
  8 cyl. 1500 rpm to 6000 rpm
- Preset at 5200 rpm for 4 cyl. engines.

APPLICATION:

Petrol engines only fitted with "Hall-effect" electronic distributors.

Part no.	Description
104145	12V Elect.Ignition (Hall Effect only)

DIAGRAM SHOWING REV LIMITER CONNECTIONS



SPIKE & OVER-VOLTAGE PROTECTOR

SPIKE & OVER-VOLTAGE PROTECTOR - 24V

Protect your electronic equipment from damage and destruction caused by power spikes and voltage surges.

Just one voltage surge or spike can cause serious damage to your electronic on-board equipment, for example, tachographs, navigation equipment and on-board computer. Imagine the cost involved in replacing those items.

OPERATIONAL DESCRIPTION:

This module provides spike voltage suppression on supply voltage and “W” terminal outputs.

The module detects continuous over-voltage of input supply and disconnects the output from the input when the input voltage exceeds a set limit. The maximum “W” terminal output is limited to 33V continuous. The module requires correct polarity supply input to provide a supply output.

HOW IT WORKS:

It works by suppressing spike voltage and detecting power surges, for example, during jump-starting (from corroded or loose battery terminals) and electric welding on chassis.

APPLICATION:

All types of vehicles, off-road equipment and marine engines, 24V

Part no.	Description
415-301	Spike & Over voltage protector 24V

DIAGRAM SHOWING SPIKE & OVER-VOLTAGE CONNECTIONS

STARTER MOTOR PROTECTOR

STARTER MOTOR PROTECTOR - 24V

Save yourself the cost of replacing your starter motor and reduce vehicle downtime by fitting this device.

OPERATIONAL DESCRIPTION:

The starter motor protector module controls the engine cranking time (starter motor running time) to a maximum of 12 seconds and prevents further starter motor operation for 20 seconds. Battery voltage is monitored and starter motor operation is prevented when the battery voltage is below 18 volts for a 24 volt system. Starter motor operation is inhibited when the engine is running.

FEATURES:

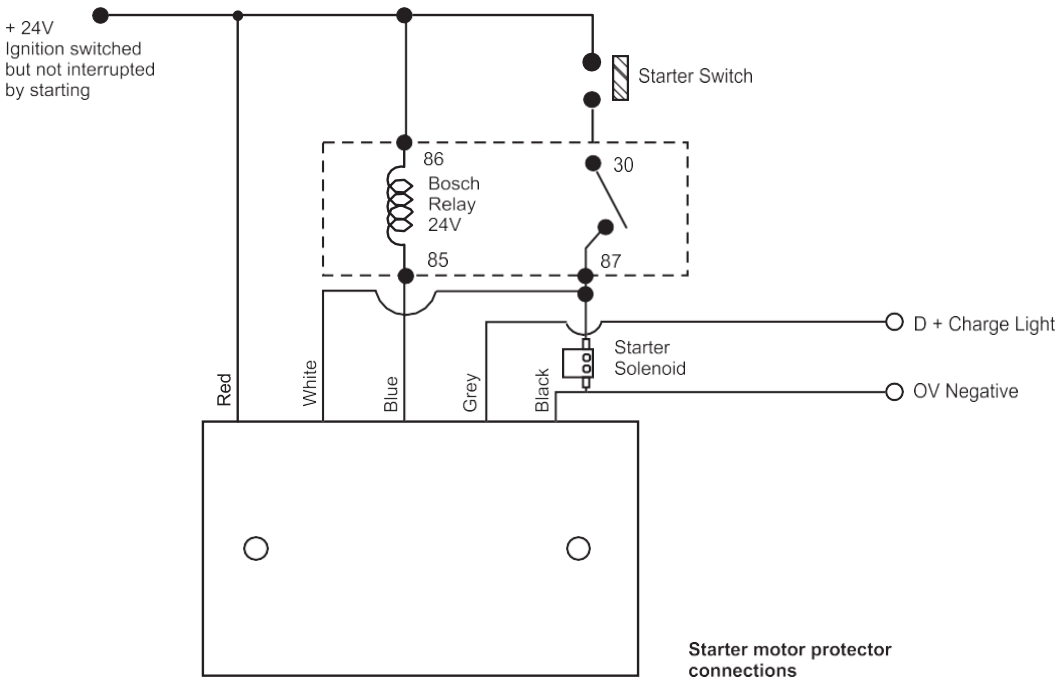
- Controls maximum continuous cranking time.
- Controls maximum inhibited cranking time.
- Maintenance-free electronic module.
- Water-proof, shock-proof module.
- High voltage spike protection.

APPLICATION:

All types of vehicles, off-road equipment and marine engines, 24V.

Part no.	Description
415-300	Starter Motor Protector 24V

DIAGRAM SHOWING STARTER MOTOR PROTECTION CONNECTIONS



Starter motor protector connections

TILT SWITCH

TILT SWITCH

The Tilt Switch is specifically designed to detect a vehicle rollover. The unit is built to withstand heavy vibration without giving false readings. After rotating past 45º "along its longer axis" for greater than 4 seconds, the unit trips a relay and holds until it returns to less than 45º tilt.

Tilting along its narrow axis requires around 70º to activate, allowing a diversity of applications. The delay is ideal where the terrain may cause the rotation to momentarily pass 45º as it needs to stay past 45º for more than 3-4 seconds to trip the sensor. Supply voltage is flexible, operating anywhere from 10-32V DC.

Even in the roughest terrain there will be no false readings until the vehicle stays past 45º. This unit is built to drive a relay (500ma max. on blue wire) so as to allow for greatest variety of applications, such examples are fuel cut-off, engine-kill, sending a signal to an onboard computer, etc.

The switch is in solid epoxy which provides all weather protection for use in the harshest environments.

FEATURES:

- Operating Voltage: 10 to 32 Volts.
- Temperature range: -40ºC - +85ºC.
- Preset at 60º.
- Mercury contacts.

BENEFITS:

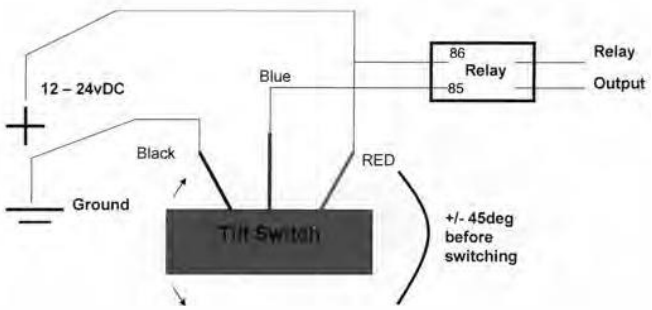
- Used for insurance purposes.
- Reduces downtime.
- Saves the engine.
- Prevents possible engine fire.

APPLICATION:

All types of vehicles, petrol or diesel engines 12/24V

Part no.	Description	Delay Times
415-218A	Rollover (Tilt Switch)	4 Second
415-218B	Rollover (Tilt Switch)	2 Second
415-218C	Rollover (Tilt Switch)	1 Second

DIAGRAM SHOWING TILT SWITCH CONNECTIONS



TURBO TIMER

TURBO TIMER

The Turbo Timer is suitable for petrol or diesel engines. It does not limit the engine revolutions & allows normal operation of the vehicle. When the engine reaches the threshold engine revolution, the turbo timer is activated. The built-in timer starts counting when the ignition is switched off, allowing 2min of idling time to allow the turbo to “cool-off”. After the 2min has elapsed the vehicle will automatically switch off.

OPERATION:

1. Rev up the engine to the turbo operating speed (factory specified RPM) or 1000 RPM for diesel engines & 2500 RPM for petrol engines. These are approximate values. It is recommended to contact the vehicle manufacturer for correct turbo operating speeds.
2. Turn potentiometer until the LED comes on.
3. Reduce engines rev to idle and check that the LED goes off again.
4. Switch off ignition and wait for 2min to ensure that the Turbo Timer keeps the engine running for 2min.
5. Connect to either W-Terminal or Negative coil.

FEATURES:

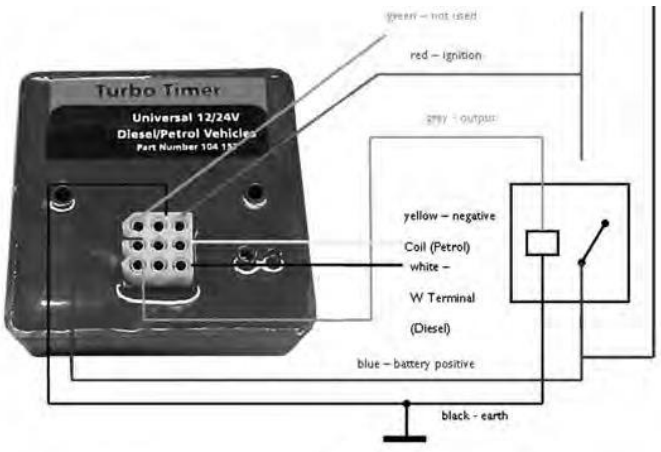
- Built in spike protection.
- Thermal shutdown protection.
- Reverse polarity protection.
- Maximum output current 7A for limited time.
- 12/24V version operates between 150Hz & 1000Hz from W-Terminal off the alternator.
- 2 min shutdown only starts after engine RPM has dropped below present parameters.

APPLICATION:

All types of vehicles, petrol or diesel engines.

Part no.	Description
104-SPEC-301	Turbo Timer Kit with harness
104157	Turbo Timer Module 12/24V
104158	Turbo Timer Harness 1.5M

DIAGRAM SHOWING TURBO TIMER CONNECTIONS



PICK-UP SENSOR - HUBODOMETER

PICK-UP SENSOR - MAGNETIC

The electro-magnetic sensor measures speed via an electro-magnetic charge and passes this signal onto the tachograph, speedometer and any on-board computer

FEATURES:

- High output voltage signal.
- Wide operating temperature range.
- Durable aluminium threaded sleeve with lock mount for adjustable depth applications.
- Heavy duty wiring harness.

APPLICATION:

All types of American trucks, e.g. Eagle, Mack, Freightliner and International.

Part no.	Description
104-107	Speed sender single output
104-112	Speed sender dual output

HUBODOMETER

The Hubodometer is a totally sealed, stand alone mechanical distance-counter mounted onto the wheel hub of a trailer or truck. It counts the revolutions of the tyre and converts them into actual distance travelled.

FEATURES:

- Records every tyre revolution in either direction.
- Hermetically sealed with inert gas and anti-fog double O-ring protection.
- Precision shaft is supported both from the front and rear for greater strength.
- Unique counterbalance system.
- Prevents orbiting even on rough roads.
- Magnifying crystal enlarges kilometre digits, angles up for easy reading.

BENEFITS:

- Maintenance dates can be planned and observed.
- Tyres, brakes and other important components can be checked for wear and tear in time.
- Transport and cost/performance ratios can be calculated quickly.
- **Prevents “ghost” trips (if the speedo is disconnected, there is still an accurate reading of distance travelled).**

HUBODOMETER

HUBODOMETER (CONT...)

Part no.	Description	For tyre sizes
VR1100X22	Tyre turns 294/km	1100 x 22
		12 x 24.5
		1100 R22
		1200 R20
VR1100R20	Tyre turns 300/km	1000 x 22
		1100 R20
		1000 R22
		11 R24.5
VR1100X20	Tyre turns 310/km	1100 x 22.5
		1100 x 20
		12 R22.5
		315/80 R22.5 1100R 22.5
VR1000X20	Tyre turns 316/km	1000 x 20
		1000 R20
		850 x 16
VR800R20	Tyre turns 326/km	10 x 22.5
		10 R22.5
		900 R20
VR715X16	Tyre turns 392/km	715 x 16
		750 x 16
VR700X16	Tyre turns 424/km	700 x 16
		750 x 16
VR115X80R13	Tyre turns 572/km	155 x 80 R13

Other ratios available on request

PEDAL INTERFACE II

PEDAL INTERFACE II

Can combine Cruise Control, Speed Limitation and RPM control in one.

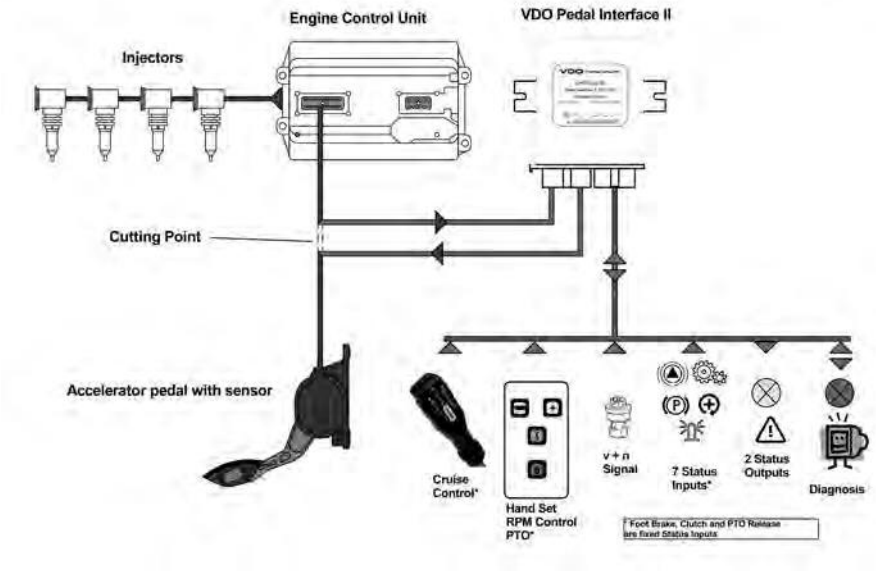
Our Pedal Interface II is the simple, cost effective way to control electronically managed engines, and is available in three versions:

STANDARD, ENHANCED and PREMIUM.

Market Segments	Standard	Enhanced	Premium
Main Function:	Cruise Control	Road Speed Limiter	RPM Control
Market Segment:	On Highway, P&A	On Highway, P&A	On/Off Highway OE
Application:	Car/Van	Van/LCV	Special LCV

Installation Overview

The Pedal Interface II is installed between the electronic accelerator pedal and the engine control unit. The electrical signals from the pedal pass the VDO the Pedal Interface II ECU before reaching the engine ECU. For Road- and Engine speed control, the signals are modified from the VDO Pedal Interface II ECU. Because of the different electrical signals on the various vehicles, each vehicle needs a special master file for installation. This master file is downloaded during installation.



Part no.	Description
X10-737-100-001	Standard kit
X10-737-101-001	Enhanced kit
X10-737-202-001	Premium kit

All above kits consist of: Electronic control module, Wiring harness and Accessories kit

PEDAL INTERFACE II(CONT...)

PEDAL INTERFACE II (CONT...)

SINGLE COMPONENTS AND INSTALLATION ACCESSORIES

Part no.	Description
X39-737-101-001	Control module (Enhanced)
X39-737-300-003	Installation accessories kit
X39-737-300-008	Wiring harness
X39-737-003-003	PTO hand controller
X39-737-300-004	LED stalk control switch (R/hand)
X39-737-300-005	LED stalk control switch (L/hand)
X39-737-300-006	Flexible control stalk switch (R/hand)
X39-737-300-007	Flexible control stalk switch (L/hand)
X39-397-106-152	Clutch switch
X39-737-300-009	Contactless clutch switch

FUNCTION OVERVIEW OF THE DIFFERENT VERSIONS

Version:	Standard	Enhanced	Premium
Cruise control:	X	X	X
Max. road speed limit:		X	X
Additional road speed limit:	X	X	X
Additional road speed limit (RPM Limiter):		X	X
Fixed RPM control:			X
Variable RPM control:			X
Position limiter:			X
2 outputs	Cruise: on. Variable: on	Programmable	Programmable

REVERSING CAMERA

A2C59517750

A2C59517749

REAR CAMERAS

FEATURES:

- 1/3" Sensor Sony super HAD CCD
- 420 TV lines (270,000/320,000 Pixels)/0 Lux at F2.0 (with LED on)
- Normal and mirror mode
- LED IR for night vision
- Auto IRIS lens
- Audio function
- 100% Waterproof design (IP68)
- Alluminium diecast housing rustproof and vandalproof
- Vibration resistant (10G)
- Operating temperature from -30ºC to +60ºC (A2C59517750)
- Operating temperature from -50ºC to +60ºC (A2C59517749)
- Wide view angle 150º (120º for A2C59517749)
- Heating system built-in
- Sun shield (only A2C59517750)
- **Dimension:** 70mm(W) x 42mm(H) x 55mm(D) (A2C59517750)
  60mm(W) x 55mm(H) x 78.5mm (D) (A2C59517749)
- **Weight:** 0.3kg

Part no.	Description
A2C59517750	Black IR colour rear view camera
A2C59517756	White IR colour rear view camera
A2C59517749	IR colour side rear view camera

MONITOR

MONITOR (12-24V)

FEATURES:

- 7" Colori Wide (16:9) TFT-LCD Monitor
- Mode: Nor./Mir. and Up/Down Image reversing
- 10 - 32V DC Free Voltage supply
- 4 Camera inputs (A2C59517753)
- 3 Camera inputs (A2C59517754)
- 3/4 ch. Trigger function (auto power ON)
- Auto bright: build-in CDS sensor
- Auto detection of vehicle movement
- Accepts PAL, NTSC and SECAM formats
- 6 Languages (English, German, Italian, French, Spanish and Japanese) OSD
- Automatic rear-gear activable distance marker
- A/V in for VCR, VCD, DVD - optional
- Button illumination through back lighting LEDs
- Built-in speaker
- Rainproof (IP 54)
- Vibration resistant (4G)
- Sun Visor with urethane protection (pat. pend.)
- Mountable to the dashboard, ceiling and windshield
- Compact design

TECHNICAL FEATURES:

- **Screen format:** 7" Wide/155mm x 89mm
- **Resolution:** 1440(W) x 234(H) pixel
- **Dot pitch:** 0.107(W) x 0.370(H)mm
- **View angle:** Up: 40º
  Down: 60º
  Left: 60º
  Right: 60º
- **Input formats:** NTSC/PAL/SECAM
- **Input channels:** 3-4 cameras/AV Input (opt.)
- **Supply:** DC 10-32V Free Voltage
- **Currently consumption:** Max. 14 Watt
- **Operating temperature:** from -20ºC to + 70ºC
- **Storage temperature:** from -30ºC to + 85ºC
- **Dimension:** 186(W) x 132(H) x 25(D)mm
- **Weight:** 0.6kg

Part no.	Description
A2C59517753	7" Colour QUAD Monitor
A2C59517754	7" Colour Monitor

EXTENSION CABLES

6 poles extension cables. Steel screw locking connectors.

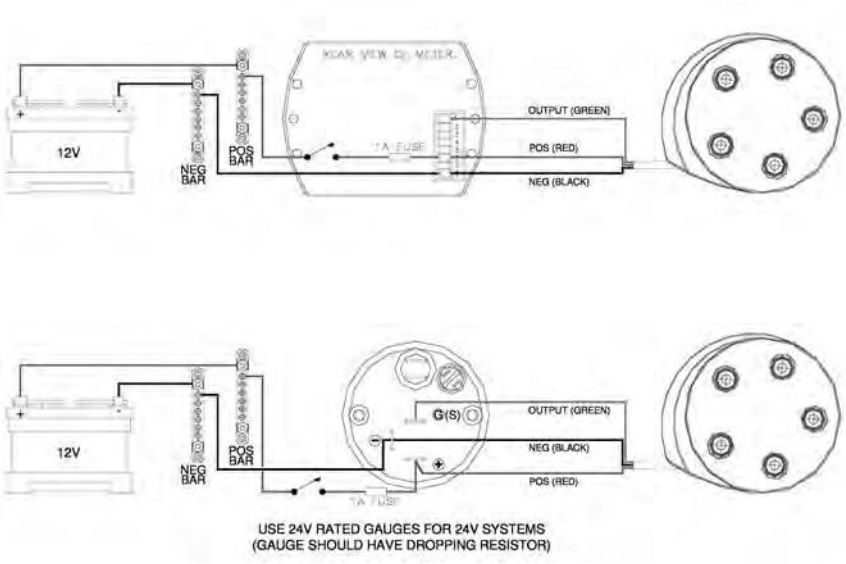
Part no.	Description
A2C59517751	10m length
A2C59517752	20m length

ULTRASONIC TANK SENDER

ULTRASONIC TANK SENDER - WIRING DIAGRAM

IMPORTANT:

- The TS1 is not recommended for use on tanks under 200mm.
- Mounting with baffles: The TS1 can be mounted 60mm from a vertical tank baffle.
- The TS1 (acoustic protrusion) see page 151, must not touch the wall of the tank. Otherwise, the TS1 will not function.
- Please use the gasket provided, otherwise the TS1 will not function. (Cork/Viton).
- Use 5 washers provided, washers must be placed under screw heads to prevent rubber lid damage.
- Maximum torque for the mounting screws is 0.5 Newton meter.
- 10-180ohm, 240-33ohm and 10-300ohm settings are suitable for analogue gauges only.
- The VDO Lever-Type fuel gauge 10-180ohm, is suitable to operate with the ultrasonic sender



PROBLEM SOLVING:

- **Error message:** The output will decrease towards empty and increase towards full, repetitively when no tank depth can be found after approximately 10min.
- **Water Tanks:** After long periods of no use, condensation will build up on the roof of the water tank and the sender face. If the water droplets are large, the sender will not be able to read the contents of the tank accurately. This will clear with normal boat or RV use.
- **Waste Tanks:** Large amounts of foam bubble on the surface of the liquid caused by detergents or washing powders will result in the sender not receiving reflected sound pulses back from the liquid surface. Instead these will be absorbed by the bubbles until they disperse. Then normal operation will resume.

ULTRASONIC TANK SENDER(CONT...)

ULTRASONIC TANK SENDER (CONT...)

APPLICATION:

Can be used on Fuel (petrol & diesel) and Fresh Water tanks. Standard off-the-shelf TS1 is set for 200mm-2M depth.

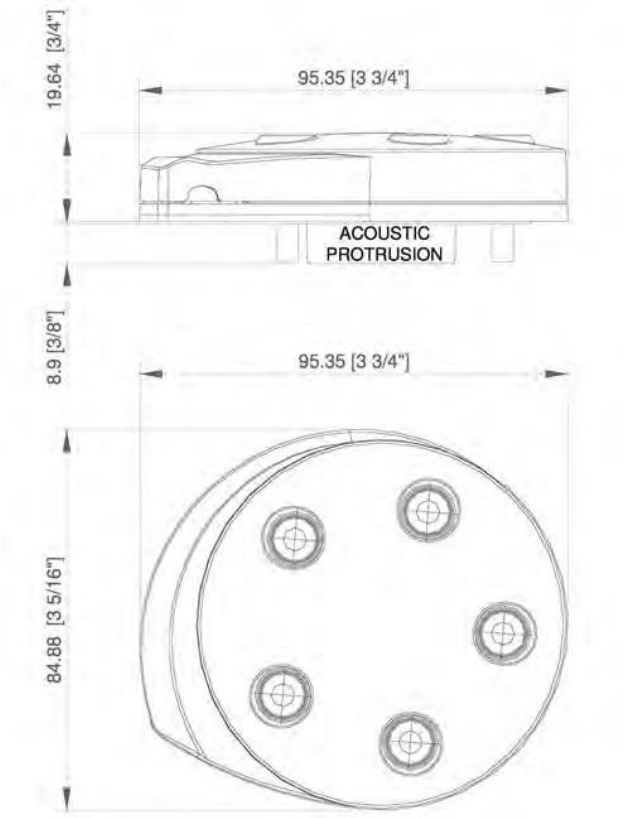
FEATURES:

- Operating distance of 200mm to 2000mm.
- Linear and non-linear tank calibration at 5 levels.
- Supports metal and plastic tanks.
- Industry standard SAE-5 stud mounting pattern with gasket seal and washers.
- Supports 10-180, 10-300, 240-33 and 1-5 volt gauge outputs.
- Resistant to petrol, diesel, water and chemical toilet.
- Operating temperature range of 4ºC to 65ºC.

PLUG INFORMATION AND SPECIFICATIONS:

- RED - Battery Positive.
- BLACK - Battery Negative.
- GREEN - Output to Gauge.

Part no.	Description
TS1-Promo Kit	Consists of 12 x TS1's and the TS1-PK programming kit
TS1	Tank Sender
TS1-PK	USTS Programming Kit USTS (Ultrasonic Tank Sender)



PARTS LISTING –
FUEL PUMPS

High quality VDO fuel supply systems offer the assurance of constant and reliable fuel supply from tank to engine.

Idle running of pumps, contaminated fuel or faults in the vehicle electrics can lead to failure of individual components or, in a worse-case scenario, failure of the system. VDO genuine brand replacements parts enable trouble-free replacement with low installation outlay and top quality.

The product range that is highlighted in this section covers VDO fual pumps for various South African passenger car and light commercial vehicle applications.

Vehicle	Derivative	Engine	Year	Part No	Type
AUDI					
A3	1,8	AGN	98 on	**E22-041-095Z**	S/Pot
A3	1,8	AGN	98 on	**405-058-005-011Z**	Unit
A3	1.8T	AGU	98 on	**E22-041-095Z**	S/Pot
A3	1.8T	AGU	98 on	**405-058-005-011Z**	Unit
A3	1.9TDI	AGR/AHF/ALH/ASV	97-01	**E22-041-096Z**	S/Pot
A4	1.8	DR/APT/ARG/AVV	95-00	**E22-041-058Z**	S/Pot
A4	1.8T	AEB/ARK/APU/ANB/AWT	95-00	**E22-041-058Z**	S/Pot
A4	2.4	AGA/ALF/AML/ARJ/APS	97-00	**E22-041-058Z**	S/Pot
A4	2.6	ABC	95-00	**E22-041-058Z**	S/Pot
A4	2.8	AAH/ACK/ALG/AMX/APR/AQD	95-00	**E22-041-058Z**	S/Pot
A6	1.8T	AEB/ANB/APU/ARK/AWT/AJL	97-05	**E22-041-094Z**	S/Pot
A6	2,4	AGA	97-01	**E22-041-094Z**	S/Pot
A6	2,6	ABC	94-97	**405-052-003-002G**	Pump
A6	2,8	ACK	97-01	**405-052-003-002G**	Pump
A6	2,8	ACK	98-01	**E22-041-094Z**	S/Pot
A6	2,8	AAH	94-97	**405-052-003-002G**	Pump
A8	3,7	AEW	96-99	**405-052-002-001Z**	Pump
A8	4,2	AQF/ABZ/AUW/AUX/AKG	98-02	**405-052-002-001Z**	Pump
BMW					
316i	E30	M10	83-90	**228-220-004-002C**	Unit
316i	E30	M40	89-92	**228-220-004-002C**	Unit
316i	E36	M40	92-94	**228-222-005-001Z**	Unit
316i	E36	M43	96-97	**228-222-005-001Z**	Unit
316i	E36	M43	97-98	**228-222-005-003Z**	Unit
318i	E30	M40	89-92	**228-220-004-002C**	Unit
318i	E36	M42	92-96	**228-222-005-001Z**	Unit
318i	E36	M42	92-96	**228-222-005-003Z**	Unit
318i	E46	M43	99-01	**228-222-009-002Z**	Unit
318i	E46	N42	01-03	**228-222-009-002Z**	Unit
318iS	E36	M44	96-99	**228-222-005-003Z**	Unit
320i	E36	M50	92-96	**228-222-005-001Z**	Unit
320i	E36	M50	93-96	**228-222-005-003Z**	Unit
320i	E46	M52	99-05	**228-222-009-002Z**	Unit
323i	E36	M52	96-99	**228-222-005-003Z**	Unit
323i	E46	M52	99-01	**228-222-009-002Z**	Unit
325i	E36	M50	92-95	**228-222-005-001Z**	Unit
325i	E36	M50	92-95	**228-222-005-003Z**	Unit
325i	E46	M54	00-05	**228-222-009-002Z**	Unit
730i	E38	M60	92-94	**E22-041-080Z**	Pump & Filter
735i	E38	M62	92-95	**E22-041-080Z**	Pump & Filter
740i	E38	M60	92-95	**E22-041-080Z**	Pump & Filter

Vehicle	Derivative	Engine	Year	Part No	Type
LAND ROVER					
TD5	2.5 Diesel	5 CYL		**A2C59511614**	Pump
Freelander	1.8i 16V	YA999999	98-00	**228-232-003-001Z**	Unit
VOLKSWAGEN					
New Beetle	1.6	AWH	99-00	**405-058-005-011Z**	Unit
New Beetle	1.6	AWH	99-00	**E22-041-095Z**	S/Pot
New Beetle	1.8T	APH/AVC/AWU/AWV/AGU/BKF	99 on	**405-058-005-011Z**	Unit
New Beetle	1.9TDI	ALH	98-04	**E22-041-096Z**	S/Pot
New Beetle	2.0	AQY/AEG/APK/AZG/BEV/AVH	98 on	**405-058-005-011Z**	Unit
New Beetle	2.1	AZJ/BER/BEJ/BHP/CBPA	99 on	**E22-041-095Z**	S/Pot
Golf II	1,8	HV	84-92	**E22-057-013**	L/Pump
Golf III	CARB	MODELS	96-99	**228-225-021-004C**	Unit
Golf III	1.6 F.I	AFX	96-99	**228-225-020-004C**	Unit
Golf III	1.6 F.I	AFX	96-99	**E22-041-056Z**	S/Pot
Golf III	1.8F.I	AFV	92-96	**228-225-020-004C**	Unit
Golf III	1.8F.I	AFV	92-96	**E22-041-056Z**	S/Pot
Golf III	1.8GTi	AFW	93-99	**228-225-020-004C**	Unit
Golf III	1.8GTi	AFW	93-99	**E22-041-056Z**	S/Pot
Golf III	2.0	2E	92-99	**228-225-020-004C**	Unit
Golf III	2.0	2E	92-99	**E22-041-056Z**	S/Pot
Golf III	2.8 VR6	AAA	00 on	**228-225-020-004C**	Unit
Golf III	2.8 VR6	AAA	00 on	**E22-041-056Z**	S/Pot
Golf IV	1,6	AKL	99-04	**E22-041-095Z**	S/Pot
Golf IV	1,6	AKL	99-04	**405-058-005-011Z**	Unit
Golf IV	1,8	AGN	99-04	**E22-041-095Z**	S/Pot
Golf IV	1,8	AGN	99-04	**405-058-005-011Z**	Unit
Golf IV	1.9TDI	AHF	99-04	**E22-041-096Z**	S/Pot
Golf IV	2.0	APK	99-04	**E22-041-095Z**	S/Pot
Golf IV	2.0	APK	99-04	**405-058-005-011Z**	Unit
Jetta II	1,8	HV	84-92	**E22-057-013**	L/Pump
Jetta II	2.3 V5	AGZ	99-05	**E22-041-095Z**	S/Pot
Jetta II	2.3 V5	AGZ	99-05	**405-058-005-011Z**	Unit
Passat	1.8T	AEB	99-05	**E22-041-094Z**	S/Pot
Passat	1.8 V6	ACK	99-05	**E22-041-094Z**	S/Pot
Polo	1.8	(4 pin)	05 on	**A2C52186921Z**	Unit
Sharan	1.8T	AJH	00 on	**E22-041-095Z**	S/Pot
Sharan	1.8T	AJH	00 on	**405-058-005-011Z**	Unit
Sharan	1.9TDi	AUY	03 on	**E22-041-096Z**	S/Pot
UNIVERSAL 3.5 BAR					
Opel/Toyota/Honda/Hyundai/Mazda/Nissan				**993-784-025A**	Pump Only

228-220-004-002C

Pressure: 3 bar

228-222-005-001Z

Pressure: 3.5 bar

228-222-005-003Z

Pressure: 3.5 bar

228-222-009-002Z

Pressure: 3.5 bar

228-225-020-004C

Pressure: 3 bar

228-225-021-004C

Pressure: 1.2 bar

228-232-003-001Z

Pressure: 4.3 bar

405-052-002-001Z

Pressure: 4 bar

405-052-003-002G

Pressure: 4 bar

405-058-005-011Z

Pressure: 3 bar

A2C52186921Z

Pressure: 3 bar

4 Pin

A2C59511614

Pressure: 4 bar

Diesel

E22-041-056Z

Pressure: 3 bar

E22-041-058Z

Pressure: 4.0 bar

E22-041-080Z

Pressure: 3.5 bar

E22-041-094Z

Pressure: 4 bar

E22-041-095Z

Pressure: 3 bar

E22-041-096Z

Pressure: 0.5 bar

Diesel

E22-057-013

Pressure: 0.24 bar

Lift Pump

UNIVERSAL : 993-784-025A

In-Tank – Complete with Pump, Filter & Wiring Harness

Outlet Position: Straight

Pressure: 3.5 bar

Daihatsu Charade 1.3 & 16v
Honda Accord, Civic, V-Tec, CR-V,Legend
Hyundai Accent, S-Coupe, Elantra, Sonata
Jeep Cherokee, XJ, Grand, Wrangler
Mazda 323 all, MX-3, MX-5, MX-6
Mitsubishi Colt 1.3,GLi 1.6,GTi 16v
Nissan 200SX, Maxima QX, Pick-up
Opel Astra 1.4,1.6, 2.0 16v
Toyota all models with in-tank pumps

HEAD OFFICE
JOHANNESBURG, RANDBURG
TIME ACCESS AND AUTOMOTIVE SYSTEMS,
23 STEVENS ROAD, BLAIRGOWRIE,
RANDBURG, South Africa

Tel: +27(0)11 326 4146
Fax: +27(0)11 781 4392
adriang@lantic.net
www.t-a-s.co.za
www.timeandautomotive.co.za